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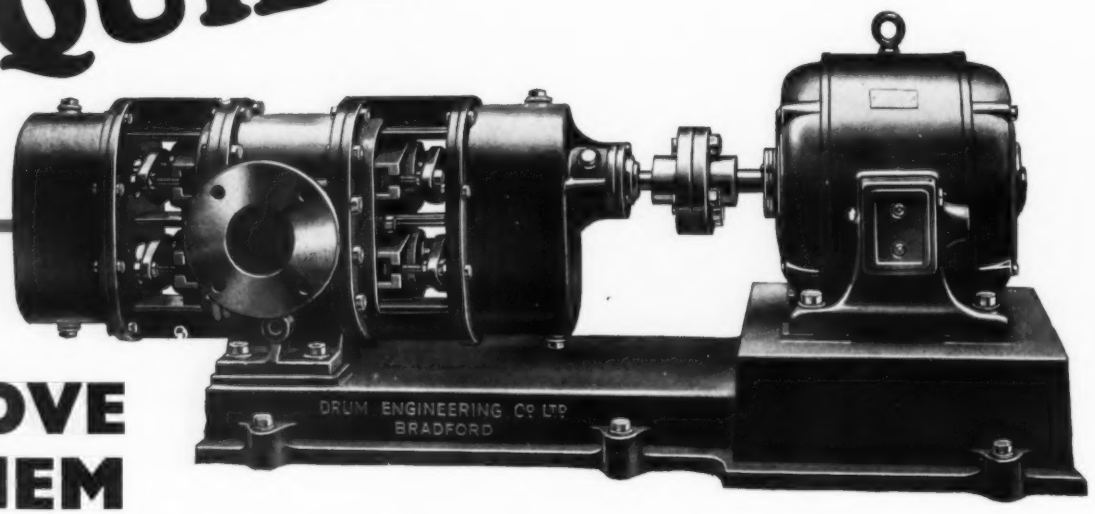

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FOOD MANUFACTURE

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The Editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings when possible.

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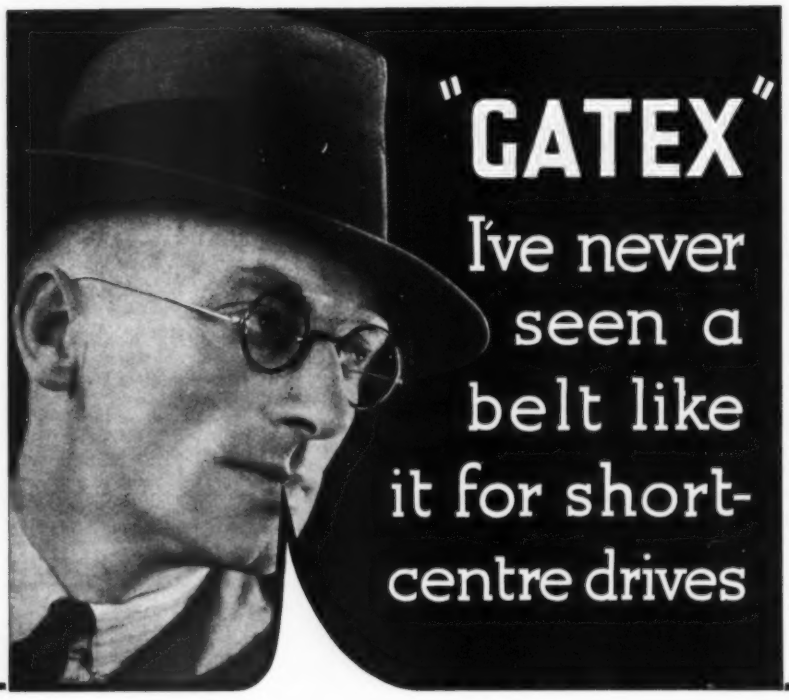
MANAGING EDITOR: G. W. Lacey, B.Sc., A.I.C.



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FOOD MANUFACTURE

Vol. XI, No. 7 July, 1936

Meat and Meat Products

MUCH HAS been said in recent years about meatless dishes, but little has been said for meat and meat products. All sorts of people remark nowadays that they eat less meat than they used to eat some years ago. Yet few, and if we are not mistaken, fewer people than ever, declare themselves to be out and out vegetarians. If meat eating is on the wane, then rank vegetarianism is certainly gaining no more ground. The fact of the matter is that people are getting more sensible about food, though there may be very much more to be learned by the average person about balancing the right foods in the diet and about the proper cooking and serving of foods. If the latter were better appreciated we should have a better understanding of the value of canned foods. But what are the manufacturers doing to popularise meat products in this country? Very little, as far as we can see. The variety of products offered is indeed conspicuous for the general lack of imagination shown in their production and especially in their presentation. It is just as essential, if not more so, to ring the changes in a line of meat products as it is in biscuits, confectionery or any other manufactured foodstuff. In this country we have brawns, galantines, pastes, pies and patties, sausages in two or three very simple and plain varieties and polony (not forgetting haggis and black puddings), and there ends the list of names that come readily to mind.

The appetising variety of meat "loaves" and snacks served in America should be a source of inspiration. In Germany a very high price is paid for the various types of baked hams which have been cured with fancy pickle. There appears to be no reason why the public should not be educated to mutton hams, prepared from salted legs of mutton and finally glazed. Many other portions that realise a relatively low price in their fresh state might be cured and cooked to produce an attractive meat pack as pressed or jellied lamb. There is also plenty of scope for the craftsman to present to his public meat cut in a somewhat different form. By modifying the usual method of cutting, new and attractive joints might be prepared from the so-called "coarser" cuts. The disparity in price between legs and shoulders of mutton and lamb can be traced to the difficulty in carving the latter joint. By removing the scapula (blade-bone) and humerus from the shoulder, leaving in the shank-bone, it is possible with the aid of a trussing needle and string to make a fair representation of a duck, which is attractive and also easy to carve. Boneless glazed pork loins presented in transparent casing material, meat, cheese, and chicken galantine are all lines that receive too little attention by the average retailer in this country. It is also a significant fact that the consumption of pork in America is about three times as great per head as it is in Great Britain.

Nutrition and Health

The nutrition problem is a very difficult one. As we have just said, people are getting more sensible about diet, which must mean that they are getting better nourishment. But with every pronouncement, either by scientific, economic, or domestic workers, the complication of the problem increases. In the July issue of the quarterly, *The Countryman*, a housewife, writing about "This Food Business", asks "How much longer are we to listen to all this ballyhoo about food?" Part of the trouble, she goes on to say, is that the advice given is contradictory, which is really not far wrong. "We must not buy meat", she says, "from which the bloom has been removed by a sea voyage, but buy English. If we want to be sure of a tender joint of meat we have often to ask for Argentine. We must eat more bacon—with back rashers at one and six a pound—thanks to the restriction of supplies of the Danish bacon that we like. We must drink more milk, and pay four

times as much for what the babies need as the same milk fetches when it is to be given to calves and pigs. Then the scientists say that we must eat more fresh food, such as vegetables, fruit, butter and eggs. But this cuts right across the national agricultural policy" . . . and so on. What are we to answer?

Quite recently a doctor, addressing an audience on diet and disease, stated that nearly all deaths due to cancer and circulatory diseases, among certain other diseases, were due to improperly grown foods. "Not only", he said, "is immature and improperly grown food poisonous to our bodies, but the ingestion of animal flesh fed on it accounts for all our inflammatory deeds and words, sexual and otherwise"! The same speaker, after an elaborate and not to say amazing dissertation on *live* and *dead* food, as he described it, said: "The sin of eating these immature poisons is only one degree removed from the crime of canning and selling them in mass production as is now being commercialised in England." The connection between vitamins, mineral salts, and metabolism is fully recognised, but this way of expressing it is simply calculated to make the ordinary person throw up his hands in dismay. A much more interesting contribution to the subject has been made by Vilhjalmur Stefansson in a paper entitled "Adventures in Diet" included in the symposium on the chemistry of meat and meat products given at the meeting of the American Chemical Society in April of this year. In this paper the author relates how he lived, on an aggregate of more than five years, in Arctic regions strictly on meat (and water) from which all elements directly derived from the vegetable kingdom are absent. After some months of this exclusive diet the author states that he seemed both mentally and physically as well as he had ever been, and that has been his experience for periods of more than a year long. The author has also observed more than twenty men of several nationalities breaking themselves into a meat diet with similar results.

There is another aspect of the problem which has been brought to light by the publication last month of a report on *Poverty and Public Health* (Victor Gollancz, 6s.), by G. C. M. M'Gonigle, Medical Officer of Health for Stockton-on-Tees, and his co-worker, Mr. J. Kirby. In this the authors describe an investigation of slum clearance in Stockton-on-Tees, as the result of which they found that the death-rate of the people moved to a new housing estate went up in five years from 22·91 to 33·55 per thousand, whereas in a contiguous slum area left to be dealt with later the death-rate actually went down to the corresponding period. The investigators conclude that the only possible factor accounting for the rise in death-rate is the fact that the families moved to the model estate had to pay bigger rents than they were paying previously, and *had less to spend on food*. This terrible situation must be reversed. No social change should be allowed to reduce the purchasing power for food. Indeed, as Sir John Orr pointed out in a recent speech at the opening of the Scottish Food Exhibition in London, food manufacturers should be preparing for a considerable increase in the consumption of food in future years which must follow the results of social and nutritional research.

It is abundantly evident that not only must the science of nutrition, on which many workers as well as the Nutrition Committee of the League of Nations are now engaged, be advanced as rapidly as possible, but the conclusions must be interpreted to those responsible for progressive social organisation and to the people themselves, without exaggeration or distortion of the facts. The public must be better guided in the selection of the right kinds of food to buy and consume. There will be an opportunity for someone like Sir James Jeans, who has described the stars in such language that children could understand him and their parents revel in a new-found knowledge, to distil the essence of good living in simple and compelling fashion and to clear away all the humbug and confusion.

The Milk Marketing Scheme

The somewhat rowdy scenes that punctuated the proceedings at the Annual Meeting of the Milk Marketing Board on June 11 were sufficient to make us sit up and take notice. We would refer our readers back to our Editorial Comments in the April, 1933, issue (page 112), in which we said: "A big danger lying ahead of the milk industry is the further stimulation of production beyond the capacity of the market to absorb milk at a price profitable to producers. It is necessary for the success of a milk marketing scheme that a proper balance should be restored between milk production and other kinds of farming". We fear that the danger we foresaw has been reached, and is threatening the milk industry with a fresh upheaval. In a survey of the Milk Marketing Scheme (Part VIII) our contemporary *The Statist* on May 2 this year said: "It appears reasonable to conclude that the scheme has given greater stability to the producers' position in the milk

market. But it is very clear that the factor which above all threatens that stability, under existing economic conditions, is the expansion of the proportion of milk which earns the lower manufacturing price". It seems reasonable to suggest that what we said would happen three years ago has indeed come to pass. The Milk Marketing Scheme has, as Mr. Baxter said at the Annual Meeting—we imagine with some little pride—brought about an increase of 78,500,000 gallons in the volume of milk sold and an increase of 4,106 in the number of contracts in operation. Mr. Baxter seemed to think that these figures reflected the continued confidence of producers in the security and stability established for the industry by the scheme. His audience did not share this view with anything like unanimity, as there were loud cries of "No". We ourselves fail to see any point in increasing production on an unprofitable basis. If the Milk Marketing Board could have, by some means or other, persuaded the people to drink the additional milk produced at liquid milk prices we would agree that the Board would have done well, and the industry been satisfied. As far as we can see, however, there does not appear to have been any increased consumption of liquid milk and all the surplus has been poured into the manufacturing sink at prices like 5½d. per gallon. Some people may say that the 302,000,000 gallons of milk used for manufacture in England is a negligible quantity when one considers that the milk equivalent of imported butter and cheese in 1935 was about 3 billion gallons. Yet in comparison with the total production this amount having to be disposed of at 5½d. a gallon has had a very depressing influence on the pool prices. Before the scheme came into operation many farmers converted milk into butter and cheese at the farms at a profit, but owing to the depressed prices brought about by the operation of the scheme this is no longer possible, with the result that farmers find it less unprofitable to sell their milk on the board's wholesale contracts to manufacturers, rather than make and sell butter and cheese. This has meant that the M.M.B. was called upon to handle 56 per cent. more manufacturing milk in 1934-35 than in the first year of the scheme. It is significant to note that, according to the last census of the dairy herd of the country, there has been no considerable increase in the number of dairy cattle since 1933.

From Farm to Factory

The transference from farm to factory has undoubtedly been accelerated by the depression in other branches of farming. With the decline in stock rearing and fattening the value of farm butter making and cheese making has fallen, and farmers have changed their whole methods of farming. To-day gallons of milk that once went down the throats of baby pigs and young bullocks now goes down the pipes of the factories. The future of the scheme does not appear to us to be very rosy. The obvious temper displayed at the Annual Meeting showed that the dairy farmers are getting very annoyed at the whole situation, their annoyance at the meeting turned to positive rudeness and illogical clamour. The next stage from this is absolute chaos, and chaos will come if the situation is not grappled with firmly and promptly. The Ministry of Agriculture should realise that farming is a co-ordinated industry and that the policy of selecting isolated branches for special treatment is absolute folly. Agriculture must be treated as a whole and the surplus products of one section absorbed by the needs of another. If aid is given to wheat growing, it should not be withheld from barley; if milk cows are to be petted, some consideration should be given to beef cattle. We are convinced that this partitioning of various sections of agriculture into water-tight compartments is a great and tragic mistake. A much broader view and wider conception is needed. Stock should be taken of all our agricultural resources and the best use made of them. We believe that at present the milk scheme has resulted in overproduction and created a surplus that must be disposed of unprofitably. We must continue in every possible way to increase the demand for liquid milk and try to produce it at prices within the reach of the masses, but until that demand has been created milk production should be restricted to more profitable dimensions, and attention paid to other branches of agriculture.

Agriculture and Defence

Interesting points have been raised in the correspondence columns of *The Times* recently about the rapid mobilisation of agricultural resources in case of war. This forms part of the problem of food supplies in war time to which we have devoted considerable attention of late. Undoubtedly, in addition to reserve supplies it would be essential in wartime to harness every available source of food and cultivate as much land as possible in the most economic and productive manner. During the Great War thousands of acres of unsuitable land were brought under the plough, a sheer waste of

time, money, and, more important, man power. This must not occur again, and Mr. Raymond Wickham's plea for an efficient survey of all agricultural land, both existent and potential, is most timely. We ought to know exactly how much land could be profitably cultivated if required, and, what is still more important, the right type of crops to grow on the land. We have always maintained that it is folly to increase the acreage under wheat and sugar beet. These are commodities of which adequate surplus stocks should be accumulated. It would, however, be very useful to know what land would be eminently suitable for market garden produce, which areas are more suitable for stock rearing than dairy cattle, and so on. The idea of a Soil Survey is a good one, and we hope the Ministry of Agriculture will do something really useful at last and have one made.

When Experts Differ

The anomalous position at present experienced in the administration of our food laws was further demonstrated in a recent prosecution at Barnsley. The County Analyst apparently took exception to the quality of a preparation of Liebig's non-alcoholic meat and malt wine, and the firm who sold it was summoned for selling a product which was not of the nature, substance, and quality demanded by the purchaser. The County Analyst stated that the wine contained 1 per cent. meat extract and 24 per cent. of carbohydrates, of which 6 per cent. was malt extract, and he maintained that it should contain 4 per cent. of meat extract and 25 per cent. of malt extract. In his evidence he condemned the wine as practically worthless. Evidence for the prosecution was also given by the Public Analyst for Durham, who maintained that one must introduce an amount of malt to compensate for the absence of alcohol. So far so good, the prosecution seem to be winning hands down, but the defence called the City Analyst for Leeds, who expressed the opinion that the wine was in excess of minimum standard, and a Professor of Dietetics said he considered the wine of beneficial effect in certain affections and in various stages of convalescence. The magistrates had no option but to dismiss the case; the defence, however, had to pay its own costs. Now what good has come from this prosecution? We are no nearer a true knowledge of the correct standard for meat and malt wine. Well-known authorities have contradicted each other in public. A reputable firm has been dragged through the mire of the courts, successfully defended itself, and yet had to pay costs which were probably very heavy. It's all balderdash and bunkum, as Mr. Tom Walls would say.

Fumigation

In April last year we discussed the question of factory fumigation, and expressed surprise at an attack launched by a well-known public analyst on existing methods of fumigation. We thought we had answered the arguments put forward on that occasion satisfactorily, having quoted, as we did, such authorities as Monier Williams, Beran, Sudendorf, and Kroger, among others. Perhaps the analyst in question has not read our comments, but in any case he has been at it again! In his latest annual report he returns to the fray with renewed vigour, but with no fresh arguments or evidence that modern fumigation methods are objectionable or harmful. He says: "Of recent years there has been a general tightening up of the laws relating to food, but the question of treatment by chemical substances, as fumigants, of dried fruits, and other foods—*e.g.*, to destroy insect infestation—has hardly been dealt with at all".

This statement is scarcely complimentary to Dr. Monier Williams' Report No. 60 on the effects on foods of fumigation with hydrogen cyanide—to say nothing of other very important researches on the subject. We have read many reports based on a large amount of careful research and have come to the conclusion that if properly carried out under adequate supervision there is no danger to public health involved. We entirely agree that fumigation of foodstuffs should only be permitted under strict scientific control, and we still think that fumigation is an objectionable process, but a necessary one. If fumigation were prohibited some food factories would soon become infested with insect life and the products hopelessly contaminated with larvæ and bacteria. We suggest to the analyst in question, and any others who share his views, that this is a question of choosing between two evils and, to judge from all the available evidence, carefully controlled fumigation is the lesser of the two. For the time being we would refer those readers interested in fumigation methods to two comprehensive articles by T. H. Fairbrother in Food Manufacture, December, 1930, and June, 1932. Some time in the future we may hear more about the use of ultra-short radio and other waves as means of killing insect pests. They are being investigated for this purpose.

BACON FACTORIES and their DESIGN

By E. H. Callow, B.Sc., Ph.D., F.I.C.
(Low Temperature Research Station, Cambridge)

Introduction

THE HISTORY of the bacon industry in this country is very different from that of Denmark because in England the industry only supplies the home market, whereas Denmark has a highly organised export trade to Great Britain. The result is that the bacon factories in Denmark are better equipped than those in this country and are considerably larger, the average killing being over a thousand pigs a week per factory. Many factories have a greater capacity than a thousand pigs a week, and some have a smaller capacity. The Danish factories were erected for the express purpose of making bacon for export. Our own bacon factories, on the other hand, have mostly grown from small beginnings. The majority of them owe their existence to the enterprise of pork butchers or of wholesale grocers, and have grown to their present size by slow degrees. For this reason many of our factories are a medley of buildings which have been adapted for their present purpose, and have not been efficiently designed for the manufacture of bacon. There are only two factories in this country capable of handling 5,000 pigs a week. The orderly development of our bacon industry which is being fostered by the Pigs and Bacon Marketing Boards and the Bacon Development Board, however, is leading to the enlargement of existing factories and the erection of new ones. The design of bacon factories has, therefore, become a subject of immediate interest.

As a consequence of the new alignment of food production in this country and the activities of the Bacon Development Board and the Pigs and Bacon Marketing Boards, the design and lay-out of bacon factories in accordance with the latest knowledge is vitally important if the industry is to become as efficient in Great Britain as it is elsewhere. This article has been specially written for FOOD MANUFACTURE *and will be published in two parts. The drawing accompanying it will appear with each part.*—ED.

Locality

The choice of locality for a new bacon factory is of great importance. There are two schools of thought in this connection. Some think it best to have bacon factories in an area where pig production is intensive, whereas others think that bacon factories should be located in densely populated areas, where they will be close to their markets. The first school of thought would build bacon factories in East Anglia, Cornwall, and Kent, where the pig population is densest; the other school of thought would prefer London, the Midlands, the West Riding of Yorkshire, and Lancashire, where the human population is greatest. Actually there are two main groups of bacon factories, one in the Midlands and the other around Bath and Bristol, the remainder being scattered all over the country.

Factories in the pig-producing areas have the advantage that the pigs do not need to be sent long distances, but the marketing of bacon, and more especially of offals, is handicapped by the distance from potential markets. Bacon factories in large towns, on the other hand, may need to obtain their pigs from considerable distances, but have the advantage of a neighbouring market for their bacon and offals. If, in addition, such factories are large in size, a more efficient processing of by-products becomes possible. The choice of locality is thus a complicated problem, and the Bacon Development Board are very wisely carrying out an investigation of the effect of sending pigs varying distances to the bacon factory. The effect of transport on the live pig and on the curing of the resultant carcasses are being studied, and the investigation should do much to establish the *pros* and *cons* of this very controversial subject.

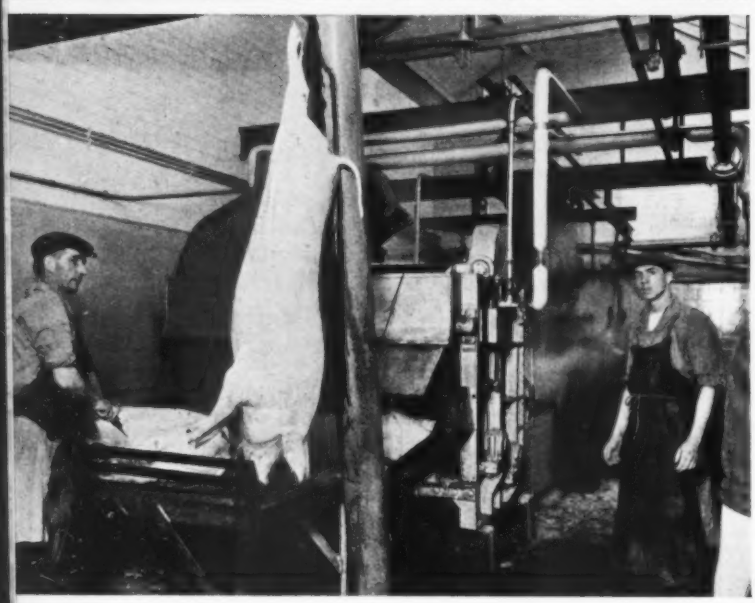
Choice of Site

Once the approximate locality for a bacon factory is settled, the choice of the actual site will depend upon the proximity of railways, roads, and possibly canals. The neighbouring network of roads and railways and its relation to pig-producing areas and to potential markets is obviously of strategic importance. There should be a good road leading to the factory capable of taking two lines of lorries, and a circular route should be provided round the buildings. The factory will need a railway siding and should be near a station in order to facilitate the arrival of pigs and other raw materials (salt, saltpetre), coal and other fuel to the factory and the despatch of bacon, offals, and by-products to their markets.

A plentiful all-the-year-round supply of good water is essential. An insufficient supply automatically sets a limit to the future size of the factory or necessitates costly measures to bring water from a distance. Bacon factories need large quantities of water, and a potential supply of 2,000 gallons an hour is by no means an overgenerous allowance for a factory which kills 1,000 pigs a

(1) & (2)

(3)



(4)

week. If the water is hard it must be softened for use in the boilers, and some curers prefer to soften the water used in the curing pickle.

The disposal of the large quantity of sewage associated with bacon factories is almost as important a matter as the water supply. Where there is no main drainage it will be necessary to erect a private sewage disposal plant, which must be capable of expansion as the factory grows. In any case, fat should be removed from the sewage before it leaves the factory premises.

The source of power in the factory also deserves consideration. All factories need electricity for light and as a source of power for the motors of refrigerating machines and of hoists and conveyors. The choice of methods for obtaining electricity (*e.g.*, the grid, steam turbines, or internal combustion engines) must be decided in the light of local conditions. The use of electricity in the bacon factory calls for very special care in wiring. The presence of brine, which is a very good conductor of electricity, means that all wires must be encased in sheathing which is both waterproof and brineproof.

Planning the Factory

The planning of the buildings for a new bacon factory calls for much care. The important point is the grouping of the various departments of the factory in relation to one another. If the grouping is not well done the factory cannot be worked efficiently. Factories should be built to a flexible design which allows for expansion, as otherwise any expansion will result in a loss of balance and consequent loss of efficiency in running. A rough diagram showing the grouping of the various departments is given in the diagram on page 241.

Lairage

Ample accommodation should be provided for the live pigs, as it is becoming increasingly evident that pigs should be rested overnight before slaughter. The lairage should be under cover and have unloading ramps by the railway siding and the roadway. The pig pens should be small and numerous, and it is often essential to keep each farmer's pigs in a separate pen. The pens and passageways should have tiled floors with grooved tiles to prevent the pigs from slipping about. The foundations should be made in such a way that the floors are not cold. Above all, the pens must be easy to keep clean and dry. There must be ready means for removing dung and bedding litter, and this refuse should be removed from the factory as soon as possible. If it cannot be removed daily it

Descriptions of Illustrations:

(1) A Killing Pen, showing the hoist and a pig in position for sticking.

(2) A carcass being lowered into the Scalding Tank by means of a semi-automatic hoist.

(3) The scalded carcasses being thrown from the Scalding Tank into the Scraping Machine by means of an automatic cradle.

(4) Scraping Machine and Table. The carcasses are automatically ejected on to the table.

should be kept in a special concreted shelter which is some distance from the factory. Each pen should have a water trough, because pigs should be watered as well as rested. Troughs should be small because large ones will get used as baths in hot weather. There should be accommodation for a weighing machine for the live animals and a passage-way to the killing pen.

Killing Pen and Bleeding Passage

The killing pen and bleeding passage should have walls of glazed white tiles. It is usual nowadays for an elektrolethaler (electrical stunning apparatus) to be installed in order that the pigs can be anæsthetised before slaughter. It is advisable that the floor on to which the pig is lowered when anæsthetised should be reasonably soft. A wooden floor covered with sawdust is sometimes used. The killing pen must also be equipped with a hoist which lifts the anæsthetised pig, by means of a shackle round its hind leg, on to the overhead rail which takes it to the killing point. The killing point is situated at one end of the bleeding passage, and at this point the overhead rail should be just high enough for "sticking" the throat of the suspended pig. The sides of the blood drain should be of glazed sanitary tiles so that it can readily be cleaned free from the splashes of blood which inevitably collect there. A suggestion for rapid cleansing is that water sprays should be fixed along the top of each wall. At the end of each day's operations the water could then be used to wash the bloodstains from the walls and clean the blood-collecting drain at the bottom of the bleeding passage. The blood drain leads to a collecting sump, where the blood is collected, whipped by rotating blades, and pumped into vessels, where it is coagulated by means of steam. The coagulated blood is filtered off, pressed in a hand-press, and the wet cake dried in a special drier. The dried blood is ground and sold as blood-meal. The bottom of the blood-collecting sump should be connected with the drainage system, in order to facilitate the rapid cleaning of the blood drain and of the sump itself.

Scalding Tank and Dehairing Machine

The carcasses are lowered by a special mechanism into the scalding tank. The shackles are removed at this point, and there should be some method—a conveyor or an inclined rail—for taking them straight back to the killing pen. The scalding water is kept at the right temperature by means of steam, which is injected at several points. It would simplify matters if the control of the steam were automatic and were made to depend upon the temperature of the scalding water. The scalding tank

(5)

(6)

(7)

Descriptions of Illustrations:

(5) Singeing furnace where the carcasses are singed for about 20 seconds and are then run under a spray of water.

(6) A view of the Butchering Floor. The singeing furnace is in the background and the special rest for the carcasses, on which they are supported while the back is being split, is in the foreground.

(7) Cooling floor where the carcasses remain overnight.

(We acknowledge illustrations 1 and 6 to Henius Limited, 2, 3, 4 and 5 to Industrial Waste Elimination, Ltd., and the Co-operative Wholesale Society, Ltd., and 7 to William Douglas and Sons, Ltd.)

must be large enough to hold enough carcasses to keep the dehairing machine continually supplied. Machines can now be obtained which take two carcasses at once. The final dehairing is done by hand on a table made preferably of cylindrical metal rollers with spaces between them through which hair and water can drop. At this point the tendons of the hind legs are separated and a gambrel is inserted.

Singeing Furnace

Above the scraping table there is a hoist, which picks up the carcasses once more, this time by means of the gambrel instead of the shackle. The carcasses are allowed to slide one by one into the singeing furnace, which is faced with firebrick kept nearly white-hot by means of steam-injected oil. Owing to the intense heat of the furnace, the sloping overhead rail at this point must be of special metal, or be a hollow tube with water flowing through it continuously. A lever opens and closes the singeing furnace and at the same time allows one carcass to slide out and one to slide in. A spray of cold water must be provided to cool the hot, blackened carcasses, and another spray to keep the skin wet while the outer blackened layer is being scraped off. This is usually done by hand, but many factories now have a "black-scraper" to remove the outer layer of singed skin. If the factory is dealing with porkers or large pigs (for sausage-making), which do not need to be singed, it is convenient to have an overhead rail which short-circuits the singeing furnace. This should be at a rather higher level than the rail for bacon carcasses, because carcasses for sausage-making come from older and longer animals. It is also convenient to have a portion of the floor below the main overhead rail built at a lower level (see plan on p. 241) so that men can stand and scrub the singed skin off the heads of bacon carcasses.

Butchering Corridor

The room in which scalding, singeing, and scraping takes place should be lofty, so that the steam from the scalding tank can rise up and escape through ventilators in the roof. In Danish factories the hot air from the singeing furnace is used for warming various parts of the factory and for warming the air where the steam is likely to form around the scalding tank. The section of the factory comprising the scalding tank, singeing furnace, and water sprays should be kept separate from the remainder. This can best be done by providing a wide corridor, well lit from above, in which the butchering operations are carried out (see plan on p. 241). Inside the corridor at the butchering point there should be a hatchway into the gut-room through which guts can be thrown. There must also be a special rail on which plucks can be hung for disease inspection before they are removed to the chilled pluck-room. A hose for washing blood from the carcass and a supply of compressed air for blowing out the washed bladders should also be provided. Just beyond this point there is generally a special stand against which carcasses can rest while the backbone is exposed.

The weighing machine and the hanging room for the carcasses should be situated at the end of the butchering corridor, which should be long enough to exclude steam and hot air from the scalding tank and singeing furnace. It is now possible to obtain rapidly acting weighing machines with a dial-face.

Hanging Room

The function of the hanging room is to cool the carcasses overnight down to a temperature of 50° to 60° F., and it is only because of extra cost that an enclosed room with specially conditioned air is not used. In the future, when curing becomes a highly standardised procedure, it will be considered essential to control the rate of cooling and the drying out of the carcasses at this stage. For this purpose the present type of hanging room (open to the atmosphere outside the factory and therefore warm in summer and cold in winter) will be too crude. Even the present type of hanging room, however, can be made more efficient by being orientated east and west in order that full advantage may be taken of the prevailing winds. It can also be equipped at both ends with openings which are fitted with adjustable louvres to control the rate of air flow. The hanging floor should be reasonably lofty and well ventilated, and the roof must be well insulated. In summer the hanging room can be kept cool by watering the floors and, possibly, by allowing the air to pass through a fine spray of water as it enters. In winter the louvres can be kept partially or completely closed.

Flooring

All the floors in a bacon factory must receive special attention. Most of them are washed once a day, many of them are almost continuously wet with water or brine, and all of them are subjected to hard wear and tear. Ordinary bricks or tiles are neither sufficiently waterproof nor hard wearing. There are, however, special clinker bricks which stand up to the exceptionally severe conditions in a bacon factory. Insistence on the right type of brick is therefore essential, especially as the wrong kind has been known to disintegrate within a few months of laying. It is also advisable to obtain a reserve supply of floor bricks, so that the occasional worn or broken brick can easily be replaced.

The hanging room may also be used as the cutting or trimming room. In many factories part of the trimming of the sides is done in this room and part in the cool-room outside the chill-room (see plan on p. 241). If the hanging room is so used, provision must be made for storing the necessary tables. Plenty of room should also be left round the outside of the rails in the hanging room in order that the normal traffic of the factory can still proceed when the carcasses are hanging (see plan).

Chill-room

After the carcasses have been hung overnight they are either partially or completely trimmed and run into the chill-room. At this stage the carcasses may be suspended as pairs of sides on lighter gambrels or as single sides on special hooks. The spacing of the rails in the chill-room depends on which of these two methods is used by the

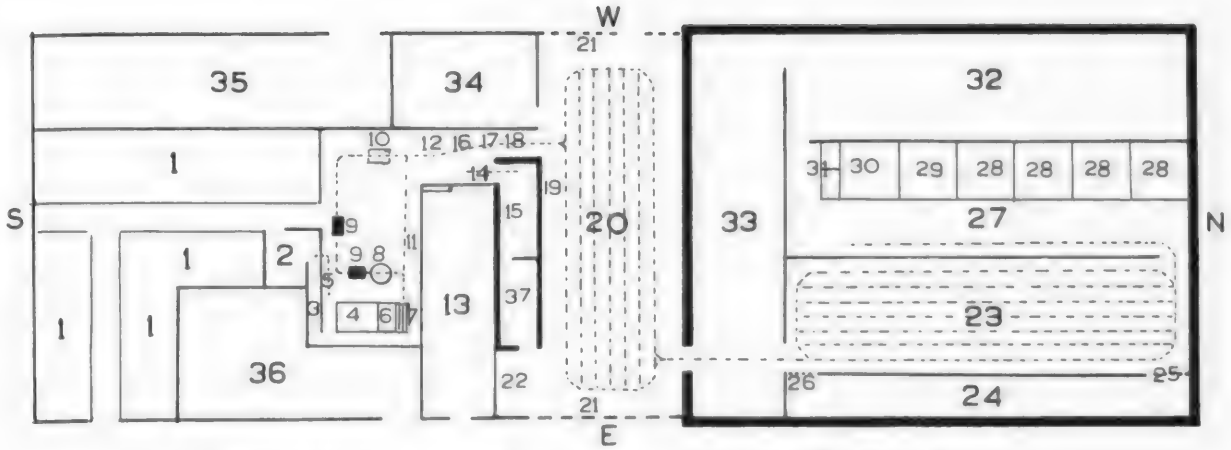


Diagram showing grouping of various departments of a Wiltshire Bacon Factory.

This diagram is not drawn to scale, but is merely intended to show the inter-relationship between the various departments. The sausage and pie-making departments are not shown, nor are the smoke stacks, as these can be grouped together in a separate block. The offices, mess-rooms, baths and lavatories should also be in a separate block.

The insulated portions of the factory are shown in heavy outline. The thin broken line represents the overhead rail on which the carcasses are suspended. The various departments are as follows:

1. Pig pens.
2. Killing pen.
3. Bleeding passage and blood drain.
4. Scalding tank.
5. Conveyor for shackles.
6. Dehairing machine.
7. Scraping table.
8. Singeing furnace.
9. Water sprinkler.
10. Lower portion of floor.
11. Overhead rail for large carcasses and for those which are not singed.
12. Butchering point.
13. Gut-room, with window opposite 12.
14. Rail for plucks.
15. Chill-room for plucks.
16. Hose.
17. Compressed air point for bladders.
18. Support for carcasses.
19. Weighing machine for carcasses.
20. Hanging room.
21. Louvres.
22. Recess for tables and for foot-washing machine.
23. Chill-room.
24. Tunnel containing refrigerating pipes.
25. Cold air inlet into chill-room.
26. Cold air intake into tunnel.
27. Curing cellar.
28. Curing tanks.
29. Filter and tank for reserve pickle.
30. Mixing tank, filter, and storage tank for pump pickle.
31. Pumps for curing pickle and pumping pickle.
32. Maturing room.
33. Air lock, trimming room, bacon baling room and lard storage room.
34. Lard room.
35. Engine room.
36. Blood, bone and meat meal and non-edible fat department.
37. Pickling tanks for feet, tongues, heads, etc.

bacon factory. Owing to the costs of construction and running, there is often a tendency to limit the size of the chill-room, but this is unwise because it automatically sets a limit to the potential capacity of the factory. It is usually very difficult to arrange for an extension of chilling space unless the original design expressly allows for this contingency.

The cooling of chill-rooms in this country is still far from perfect. Usually air is forced by a fan through a tunnel over a nest of ammonia pipes, the air flowing along the length of the pipes. [This is not the most efficient way of arranging the pipes. For better designs a study should be made of a paper by Griffiths and Awbery on "Heat Transfer between Metal Pipes and a Stream of Air" in the Proceedings of the British Institute for Mechanical Engineers, 1934, **125**, 319.] The cold air from the tunnel is usually introduced at one end of the chill-room (which is frequently a long, narrow room) and extracted at the other end. By the time that the cold air has passed through the carcasses and reached the other end of the chill-room it has picked up moisture and become warmer. This warm, moist air is repassed through the tunnel, where it deposits its moisture on the cold pipes and becomes cool once more. (A drain should be provided below the pipes.) This system of chilling inevitably leads to a lack of uniformity in the cooling and drying of the carcasses. The carcasses near the inflow of cold, dry air will be cooled and dried more than those near the exit for the air. Another disadvantage is that the moisture in the air which re-enters the tunnel may lead to the breakdown of the electric motor which drives the fan, unless this is adequately protected.

A better plan for a chill-room would be to circulate the air across and not along the room. This would, of course, be more complicated and expensive, but would give more uniform chilling. An even better plan would be for the cold air to fall from the ceiling through the carcasses and be drawn out through holes at the bottom of the side walls. This method is used in the brine spray lofts which are a feature of American packing houses. In this case the air is cooled by a spray or film of cold calcium chloride brine in a room or loft above the chill-room. This is undoubtedly an excellent method for chilling carcasses. Excess moisture is removed from the air by the calcium chloride brine, and the humidity of the air of the chill-room can be controlled within very narrow limits by controlling the strength and the temperature of the cold brine. There is no reason why this type of control should not be made automatic in its action and thus give highly standardised conditions in the chill-room. Even if this method of cooling is not used for the chill-room, the possibility of obtaining automatic control for the starting and stopping of the main refrigerating machinery should repay investigation.

(*To be continued.*)

CLARIFICATION and BLEACHING of GELATINES and GLUES

By J. A. Radley, M.Sc., A.I.C.

By the action of water and heat on hides and certain other animal material glue or gelatine may be produced according to the conditions of manufacture. The collagen in the hides first breaks down to give gelatine, and this, in turn, suffers further degradation to glue when the heating with water is continued. During the breaking down of gelatine to glue the product darkens more or less in colour, its jellying properties are diminished, the odour increased, and also its adhesive properties.

The colour of gelatine and glue, therefore, depends to some extent on the manufacturing process, and this process can be stopped at either the gelatine or the glue stage and the products treated to improve the colour, the particular process used for this being governed by the considerations set out below. For the purposes of this article, then, we may consider glue and gelatine together, subject to this reservation.

* * *

THE APPEARANCE of a glue or gelatine, like that of any other commodity, often constitutes a good selling point, especially if there is little to choose between two samples in other respects. It is less common nowadays than formerly to find a buyer who considers that a dark brown colour in a glue is indicative of strength, although it must be pointed out here that, unless very great care is taken in all stages of manufacture and purification, such purification will tend to impair the quality of the glue somewhat. With careful processing, however, the small loss of strength is more than compensated for in the better appearance of the product.

Essential Processes

In the manufacture of glue the liquor from the boiling tanks, consisting of impure glue solution and containing particles of hair, mucins, lime, soap, bone, and fatty materials in suspension, is either sedimented, filtered, or subjected to both treatments. Filtering is preferably done by gravity and not under pressure, and carbon, fullers' earth, alumina, and coarse paper pulp can be used as the medium, the last named being very effective. The glue is fed on to the paper pulp, the *p*H value of which is controlled with meticulous care, and the liquor is drawn off through an axial pipe. In addition to filtering, the liquor may be kept warm in large shallow vats and sedimented. In these vats the solid particles sink to the bottom, whilst fatty matters float to the top as a scum and are swept off. In some factories it is the rule to solvent extract the dry raw materials before processing to remove fatty matter, as it is preferable to remove impurities at the beginning than to have to remove them from the glue at a later stage. From the sedimentation tanks the clear glue is drawn off and fresh liquor run in, but, after repeating the process two or three times, the liquid becomes too full of suspended matter to allow the process to be repeated. The vat is then either specially clarified or the liquor run off and used to make "Russian glue".

Clarification

In clarifying a glue solution the *p*H value is carefully adjusted to allow as complete a sedimentation as possible. Some factories prefer to add to the crude glue a coagulant for the suspended matter, or else one chemical is added, followed by a second, which reacts with it to form a precipitate, this precipitate carrying down with it the suspended matters. Alum or aluminium sulphate is sometimes used for this purpose, but not in the manufacture of the highest quality glue, as aluminium salts reduce the elasticity of the glue and adversely affect its swelling capacity and adhesive properties. The aluminium salts act by virtue of their forming a voluminous white precipitate with the chondrin which is invariably present in glue liquors, this white precipitate having a clarifying action by absorbing or entrapping other impurities and carrying them down with it.

Clarifying Agents

Mono calcium phosphate is quite effective in slightly acid glue solutions, and here the method is to render the glue slightly acid with phosphoric acid and add the calcium phosphate to the glue at a temperature of 60° to 70° C. On treatment with the necessary amount of milk of lime a precipitate of dicalcium phosphate is formed which carries down impurities. In this process care has to be taken that the mono calcium phosphate does not contain other soluble salts and that the milk of lime is not added in excess; the glue would then have an excessive ash content—over 2 to 3 per cent.—which is the customary content of a normal good glue.

Another clarifying agent is albumen, and here use is made of the fact that, although albumen is soluble in the cold, on heating it coagulates to an insoluble mass. Two types of albumen are met with commercially—that made

from blood, which is dark coloured, and that made from egg-white—both being equally effective for clarifying purposes. If blood albumen is used, the glue liquor must be carefully adjusted to keep it just sufficiently acid. It is claimed that glues made by the albumen clarification process have a characteristic "soapy" smell and show a tendency to foam. The albumen is added to the liquor, which is kept at a temperature of 54° C. (130° F.) and then is gradually raised to 93° C. (200° F.), when coagulation takes place and the mass of coagulated albumen plus impurities starts to settle out, the settling process requiring from twelve to twenty-four hours for completion. For gelatines where a pale colour is of importance good egg-white albumen is used, but for glues the darker blood albumen is satisfactory.

Another process which has been patented by the Gesellschaft für Elektro Osmose (E.P. 21,448 and 21,484, 1914) consists of purifying the gelatine by electro-osmosis, and it is claimed that the product obtained is of a photographic grade. The liquor is contained in a vessel with a permeable diaphragm and a current passed through the cell in the usual way, the fatty matter and mineral substances passing through the diaphragm whilst the albuminous matter is precipitated.

Bleaching Methods—

Improving the colour of glue can be brought about by treating the glue with active charcoal, and some factories using this method recover the charcoal by heating it in a furnace after each filtration. In this way one charge of carbon can be used about three times, after which it is discarded. Some oxidation generally takes place in the filters and, as will be seen below, constitutes a minor but good feature of this process. For the bleaching of glues the agents used may be divided into two types, those which exert an oxidising effect and those which reduce the coloured compounds to colourless bodies. The coloured compounds in glue, like those which occur in dextrines, are somewhat resistant to bleaching agents, hence to destroy them involves the possibility of the process affecting the glue, especially if all the operations are not strictly controlled.

—Using Sulphur Dioxide

Of the several processes used commercially, the one receiving most favour appears to be that using sulphur dioxide or sulphurous acid. Liquid sulphur dioxide is readily obtainable commercially, so that few makers now make their own gas by burning sulphur or pyrites, a source of arsenic in glues in the early days. Glues and gelatines have the power of absorbing sulphur dioxide, so that even on drying some of this compound is retained and acts as a preservative, and if the gelatines are for edible purposes the amount should be estimated to see that it complies with the various Food and Drugs Acts.

Only a moderate excess of sulphur dioxide is required to bring about a satisfactory bleaching, and during the passage of the gas the liquid is kept warm, but both of the factors must be rigorously controlled, as in excess neither are conducive to the preparation of a product with good physical properties. In some cases the sulphurous acid present is neutralised with milk of lime, and the precipitate clarifies the liquid, but in this case the solution must end up slightly on the acid side to get good settling of the precipitate. This is a distinct drawback for glues to be used for a number of purposes—*e.g.*, for use with papers which have been coloured with dyestuffs fugitive to acid. A good glue should not have a marked acid reaction, and in examining glues those showing any such marked acid reaction are rejected. The precipitation by milk of lime can be followed by determining the *p*H value of the solution either by indicator papers, or, better still, by measurement of the conductivity of the liquor, the lowest value for the conductivity indicating that the glue has the minimum amount of soluble electrolytes present. The glue is usually bleached at the concentrated liquid stage, the liquor being contained in wooden or lead-lined iron vats, which are fitted with heating and cooling coils, the sulphur dioxide generally being introduced by means of another perforated coil.

Sodium or other metallic hydrosulphites are sometimes used, but except for a slight increase in the bleaching effect they show no advantage over the sulphurous acid method, and examined on a cost basis they probably show to a disadvantage. As previously mentioned, the colouring matters are fairly resistant to certain bleaching agents, and it is noticeable that the colour of a glue bleached by a reducing action is not permanently destroyed, as it returns either on exposure to air or by the action of alkalies. The same effect is also noticeable with dextrines treated with sulphurous acid. On the other hand, a permanent effect is obtained with oxidising agents, and it would appear that the colouring matters are actually destroyed by oxidation, whereas with reducing agents they are merely converted to colourless bodies which are readily reoxidised to the coloured forms. The influence of small amounts of ferric salts on the colour is quite marked, and on reduction ferric salts are changed to ferrous salts, with a consequent improvement in colour, which, however, is not permanent on exposure to air.

—By Oxidising Agents

Among the oxidising agents used, one of the most important is hydrogen peroxide, and, as the product of its decomposition is water, no extraneous matter is introduced into the glue by its use except, perhaps, minute traces of acid or salts used to stabilise it. Sulphuric is the acid most used for stabilising hydrogen peroxide, and it is customary to neutralise this after the bleaching operation has been carried out. Hide glues are often marketed as "acid free," and sometimes even in the alkaline state, so that it is very convenient that hydrogen peroxide exerts its most effective bleaching action in the alkaline state, the glue being made alkaline with ammonia. It will be noticed that this is the opposite of the case with sulphur dioxide, which acts best in an acid medium.

The peroxides of sodium and the alkaline earths have been recommended for bleaching glues, but their use involves the exercise of considerable care in processing, and also in some cases suffers from the drawback of leaving soluble inorganic end-products in the glue at the comple-

tion of the reaction. If sodium peroxide is used, the free alkali must be neutralised with acid, and this again increases the amount of soluble inorganic matters in the glue.

Calcium peroxide, if it were cheap, would be an excellent processing material, as after the bleaching stage the insoluble calcium hydroxide and calcium phosphate, formed by the interaction of phosphates in the glue, settle out and exert a clarifying effect, carrying down a large amount of the remainder of the undestroyed colouring matter and other impurities. Furthermore it is easily neutralised and removed.

The use of ozone has been tried on a practical scale, but its use has been discontinued owing to the bad effect it has on the glue, destroying its valuable physical properties. Chlorine and hypochlorites in large concentrations precipitate glue from solution, and this would appear to militate against their use in bleaching. The cautious addition of small concentrations, however, can readily be made, and good results may be obtained in this way; incidentally the small amount of chloramine which is formed acts as a preservative for the glue. The hypochlorite used may be a solution of bleaching powder, one part of bleaching powder to 2,000 parts of glue giving a satisfactory effect, the calcium present being removed after the reaction, by precipitation with dilute sulphuric or phosphoric acid.

Qualities of Gelatines and Glues

Adulteration of glue is sometimes practised, the object generally being to make a clear brown bone glue look like a skin glue, as the latter possesses the required desirable characteristics of glue in the highest degree. For this purpose dextrine and casein are added to improve the appearance, whilst the addition of a plasticiser such as glycerine improves the elasticity. These substances, however, are readily detectable on analysis.

Gelatines and glues for use in the textile industry should be neutral and should not affect any dyestuffs with which they are likely to come into contact. Gelatines for the photographic industry have to conform to fairly rigorous standards and must contain no metals or chlorine, no reducing substances, and should have a very low ash content. For the foodstuffs industry edible gelatine must contain less than 1,000 parts of sulphur dioxide, less than 1·4 parts of arsenic, 30 parts of copper, 20 parts of zinc, and no lead per million parts of gelatine, and the ash content should be low. If it is to be used in the meat preserving trade, in addition to the above requirements, it must have a low lime content.

The SHORT WEIGHT BOGEY

EVERY year about this time, when summer weather conditions are cheering holiday-makers, farmers, and gardeners, the manufacturer of pre-packed articles of food liable to evaporation is haunted by the bogey of short weight. Inspectors of Weights and Measures anxious for cases hunt the manufacturers with a relentless persistency that would have done credit to a redskin. We have every sympathy with traders and inspectors alike. The fact of the matter is that the Act is a bad one, but the Board of Trade, who were responsible for the framing of the Act, are apparently in no hurry to amend it, and thus Inspectors of Weights and Measures are compelled to administer the letter of an Act which they feel to be contrary to the spirit in which it was framed. It is a bad state of things when an inspector has to make admissions such as those made by Mr. L. G. Macy, of East Ham, and reported in the May issue of the *Monthly Review* of the Incorporated Society of Inspectors of Weights and Measures. He said: "Section 12 deals with safeguards to traders, and subsection 3, the evaporation clause, is perhaps the most important. I feel rather strongly on this point, for I am sure that a certain amount of injustice has been done in the past—quite unwittingly—by inspectors and magistrates who have not known to what extent the defence of unavoidable evaporation might be genuine. . . . We have it on unimpeachable authority that flour can lose *or* gain (that is important) under normal atmospheric conditions 4 per cent. of its own weight, which is 2½ oz. on a 3-lb. bag. Is it impossible to provide some means within the Act of determining the moisture content of any commodity to be the subject of a prosecution?"

It appears to us that sooner or later the maximum amount of moisture permissible in any pre-packed article at the time of packing will have to be defined. If this were done the possible shortage in weight due to evaporation could be stipulated. Thus, in the case of flour, if 15 per cent. were accepted as the maximum moisture content at which flour may be packed, the loss in weight, owing to exposure to average summer conditions, could be determined experimentally. If this happened to be 2½ oz. on a 3-lb. bag, to quote the figure mentioned by Mr. Macy, inspectors should be warned not to institute proceedings if the deficiency does not exceed this amount. The same thing applies to peas, lentils, or any other pre-packed article which contains moisture. We imagine that some millers and factors might object to this, but we see no reason why. In America the maximum moisture content of flour is fixed, and it is only a matter of adjustment in the milling process to keep under a certain limit, provided the limit is reasonable and consistent with good milling. We have known flour from some country mills to contain over 18 per cent. of moisture, whereas other samples we have come across have as little as 13 per cent. Obviously if these are both subjected to identical conditions favourable to evaporation the 18 per cent. sample will lose considerably more than the other. The evaporation clause in the Act should not be used as a loophole to enable millers to mill flour with an abnormally high moisture content and so sell water at the price of flour. We really think that a fixing of moisture standards would be welcomed by millers and others who know their jobs, and if it could only do away with this annual epidemic of prosecutions against innocent traders it would be well worth any trouble it might entail.

PASTEURISED CREAM

Its Flavour and Viscosity correlated with Heating Medium Temperatures

This is the second communication on the subject of Heat Transfer and its relation to the processing of milk and cream by J. C. MARQUARDT, Associate in Research at the New York State Agricultural Experiment Station, Geneva, N.Y. The first communication was published in July, 1935, and the third will be given in October.

A study has been made of the influence of the temperature of pasteurisation and of the heating medium on the flavour and viscosity of cream pasteurised in stainless steel and glass-lined vats. It was found that cream was more apt to develop a heated or cooked flavour during pasteurisation than milk. For this reason the temperature of the heating medium needed to be lower and the temperature of the pasteurisation was especially important. Cream separated from pasteurised milk was free from cooked flavours. Cream pasteurised at 143½° F. was generally free from cooked flavour, while cream pasteurised at 150° F. usually possessed a heated or cooked flavour. Furthermore, the higher temperature of pasteurisation reduced the viscosity of the cream to the greater extent. The heated flavour was associated with the fat to a greater extent than with the serum, although both were involved.

INTRODUCTION

THERE HAS been much discussion concerning the temperature of the heating medium, the time required to heat, and the presence of a film on the pasteuriser lining upon the flavour of pasteurised sweet cream. The rate at which heat is transferred through two materials commonly used in building pasteurisers has been established.* The influence of heat transfer factors upon various properties of pasteurised milk has also been studied.†

Under the conditions of the milk flavour studies it was possible to employ steam under pressure as the heating medium in the glass-lined vat without imparting a heated flavour to the milk. In the steel-lined vat water at 200° F. was used without imparting a heated flavour to the milk. These results stimulated an endeavour to associate heated flavours and viscosity of cream with the rate of heat transfer. The heat transfer rates involved heating medium types and temperatures, pasteurisation temperatures, and the types of pasteuriser linings. The effect of deposits inside the pasteuriser were also investigated. Viscosity, separation, and plug formation will be included with the cream pasteurisation studies.

PROCEDURE

Arrangements were made so that a supply of 80 gallons of raw 40 per cent. cream was available daily.* The two pasteurisers previously used were again employed in this study.† The metals used as linings for the pasteurisers were stainless steel and glass-lined steel. The stainless steel contained 18 parts of chromium, 8 parts of nickel, and 74 parts of iron, and was highly polished and of a uniform thickness of $\frac{3}{25}$ inch. The latter consisted of steel $\frac{1}{8}$ inch thick, upon which three coats of No. 20 glass enamel had been sprayed and fused. These metals were selected for several reasons. In the first place, with tinned copper, they constitute the bulk of linings for vat pasteurisers. With tinned copper vats the rate of heat transfer is sufficiently rapid to permit the use of a rather low heating medium. On the other hand, a higher heating medium is used for glass-lined and stainless steel-lined pasteurisers to give satisfactory speed of heating, and it is principally with such equipment that discussion arises concerning the temperature of the heating medium. It would have been desirable to have used a tinned copper lining in a third pasteuriser, but this would have complicated the securing and presenting of the data.

The two pasteurisers‡ illustrated in Fig. 1 were constructed comparable in every respect except for the linings. Each lining had a heating area of 14·9 square feet, the diameter being 20 inches. They were insulated with 1 inch of cork and covered with galvanised iron. The pasteurisers were jacketed in like manner. Each heating jacket had a capacity of 30 gallons. The jackets and linings were constructed to withstand steam pressures as high as 3 pounds. Each jacket was fitted with water, steam, and brine connections. A centrifugal pump with a capacity of 6·7 gallons of water per minute provided circulation within the jacket for heating purposes. The cold water, direct from the pipe-lines, flowed at the rate

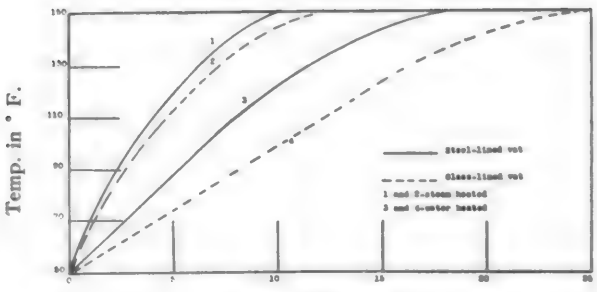
* Marquardt, J. C., Pheteplace, W. D., Jr., and Dahlberg, A.C., "Heat Transfer through Stainless Steel and Glass-lined Steel in Dairy Pasteurisers", *New York Agr. Exp. Sta. Tech. Bull.* No. 211, 1933.

† Marquardt, J. C., and Dahlberg, A.C., "Pasteurised Milk Flavour and Creaming Power as Affected by Heating Medium, Temperatures, and Pasteuriser Linings", *New York Agr. Exp. Sta. Tech. Bull.* No. 223, 1934.

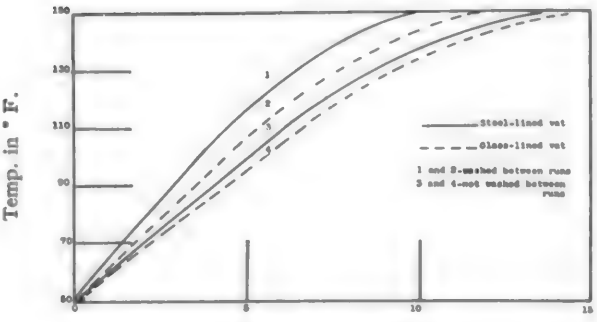
* The helpful assistance of the Wetmiller Dairies, Cohocton, New York, in supplying this cream is acknowledged.

† These pasteurisers were illustrated in Mr. Marquardt's last article, page 242, July, 1935.

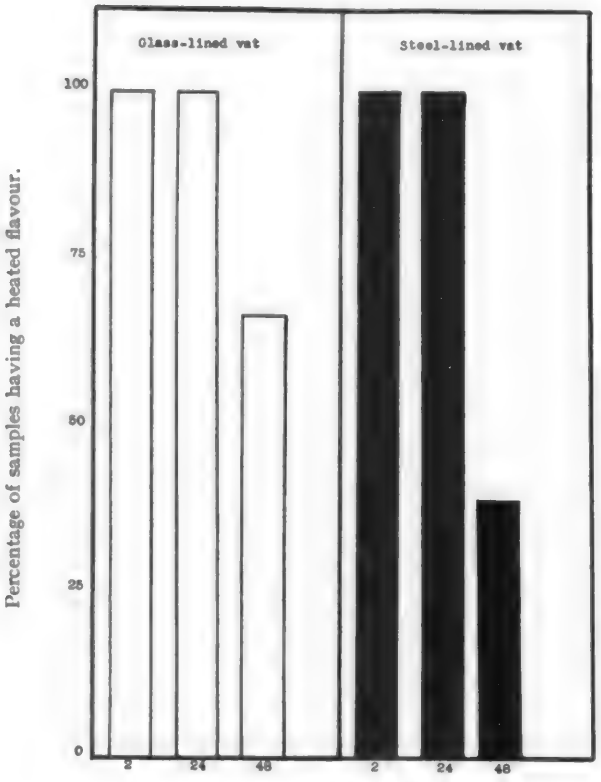
‡ The author is indebted to the Pfaudler Company of Rochester, N.Y., for the construction of these pasteurisers.



(Fig. 1.)



(Fig. 2.)



(Fig. 3.)

FIG. 1.—Time required to heat cream to 150° F. using steam at 220° F. and water at 180° F.

FIG. 2.—Effect on time required to heat cream with steam at 220° F. to 150° F. with and without washing of vats between consecutive runs.

FIG. 3.—Heated flavours in cream pasteurised to 150° F. with the heating medium at 210° F. or above.

of 7·1 gallons per minute. Thermometers were inserted in the jackets and pipe-lines so that a record of the temperature of the ingoing and outgoing water, steam, or brine could be determined.

Each pasteuriser was equipped with a vertical three-blade propellor agitator, the blades being $4\frac{1}{8}$ inches from the centre of shaft to tip of blades. This agitator was 5 inches from the side and 5 inches from the bottom of the tank, being attached to the bottom end of a 1-inch vertical shaft. Each agitator could be rotated at 56, 110, 172, and 218 revolutions per minute by the use of various sized pulleys.

The cream was pasteurised in 20-gallon amounts. For each pasteurisation the temperature of the heating medium, viscosity of the cream, and the time required to heat were recorded. Skin formation on the walls of the pasteuriser was noted. The effect of removing or not removing this skin film upon the heating-time, flavour, and quality of subsequently pasteurised cream was noted. Cream batches were pasteurised at 143° and 150° F. and held for a period of 30 minutes. Steam at 210° and at 220° F. under pressure was employed mainly in the trials. The cream was agitated with a propeller revolving 172 r.p.m.

Three judges scored the raw and pasteurised samples at intervals of 2, 24, and 48 hours. They attempted to designate the raw and pasteurised samples and to note all off-flavours, especially those of a heated nature. Samples for tasting were heated to 70° F. Samples were placed in 100 c.c. cylinders and quarter-pint bottles. Observations were made after 24 hours' storage for a cream line near the bottom of the container. Each flavour sample was taken from a different bottle to prevent contamination and to allow for the formation of cream plug.

Viscosity determinations on the raw and pasteurised samples were made to show relationships between viscosity and pasteurisation temperatures, heating mediums, and the rate of agitation of the cream. The viscosity of the pasteurised cream was determined after 2, 24, or 48 hours' storage at 40° F.

Heat Transfer Values

In Fig. 1 are recorded typical heating results obtained with cream containing 40 per cent. of fat in clean pasteurisers. It was not necessary to present data for individual tests, as they agreed so well. In the series using the stainless steel-lined vat and heating with steam at 220° F. under pressure 10 minutes were required to heat to 150° F. To duplicate this result in the glass-lined vat 12 minutes were required. When the cream was heated to 150° F. in the stainless steel-lined vat using 180° F. water 18 minutes were required for the heating operation. To duplicate this result in the glass-lined vat 25 minutes were required.

Since, in the industry, the pasteurisers are frequently not washed out between runs, data were also obtained on such equipment. The results (Fig. 2) show that the time to heat was increased from 10 to 14 minutes when heating cream with steam at 220° F. under pressure in the stainless steel tank, in which the film from the previous run was not removed. In the case of the glass-lined vat this increase was from 12 to 14½ minutes. Allowing the film to accumulate in the stainless steel-lined vat decreased the efficiency of heat transfer more than when the film was allowed to remain in the glass-lined vat, due to the extra thickness of the film.

Flavour Results

A total of 1,440 individual samples were examined for flavour and odour by the three judges during the investigation. The judges independently examined the samples after 2-, 24-, and 48-hour ageing periods, and their individual comments were in agreement as far as detecting heated flavours were concerned.

The results of pasteurising at 150° F. and holding for 30 minutes are shown in Fig. 3. Under these conditions all pasteurised samples had a heated flavour when 2 and 24 hours old, when the heating medium was at a temperature of 210° F. or above. There was a tendency for this flavour to disappear during ageing. The stainless steel-lined and glass-lined vats produced the same approximate intensity of heated flavour, but there was a tendency for less heated flavours after 48 hours in cream pasteurised in the stainless steel-lined vat.

Pasteurising to 150° F. and holding for 30 minutes with the heating medium at 180° F. or below produced a cream relatively free from heated flavours. In these trials the results of both vats were summarised collectively, since they were comparable. The heated flavour in cream pasteurised at 150° F. for 30 minutes with the heating medium at 180° F. or below was noticeable in 75 per cent. of the samples at the 2-hour inspection. In all cases the heated flavour completely disappeared when the cream was 24 and 48 hours old. The results are shown in Fig. 4.

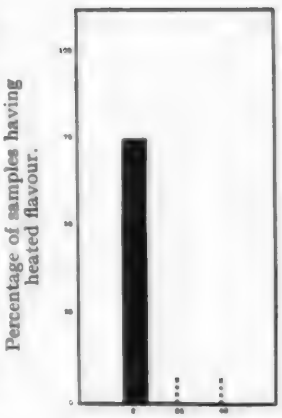
The influence of the temperature of the heating medium upon heated flavours produced in cream pasteurised at 143½° F. for 30 minutes was studied also. In these trials it was demonstrated that water at 160° or 180° F. used for heating did not impart a heated flavour to the cream. Results in both vats were comparable. When the heating medium was above 210° F. no heated flavours were produced in cream pasteurised in the glass-lined vat. With the heating medium at 210° F. or above, 75 per cent. of the samples pasteurised at 143½° F. for 30 minutes in the stainless steel vat had a heated flavour when 2 hours old. These heated flavours disappeared entirely within 24 hours. Heating mediums at 210° F. or above included water and steam at 210° F. and steam at 220° F. under pressure. The results, presented in Fig. 5, are based upon 18 series involving 162 flavour determinations by the three judges for the 2-, 24-, and 48-hour tasting periods.

Since cream pasteurised at 143½° F. in a steel-lined pasteuriser contained a heated flavour when 2 hours old in 75 per cent. of the cases when the heating medium was at

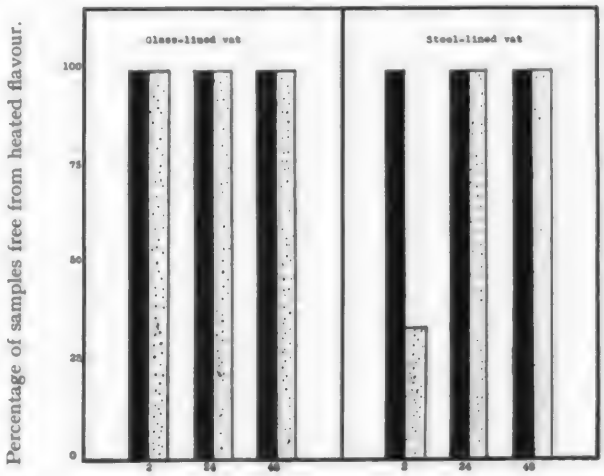
FIG. 4.—Absence of heated flavour in cream heated to 150° F. with the heating medium at 180° F. or below.

FIG. 5.—Absence of heated flavours in cream heated to 143½° F. and held for 30 minutes. (Black area, 180° F. or below heating medium. Dotted area, 210° F. or above heating medium.)

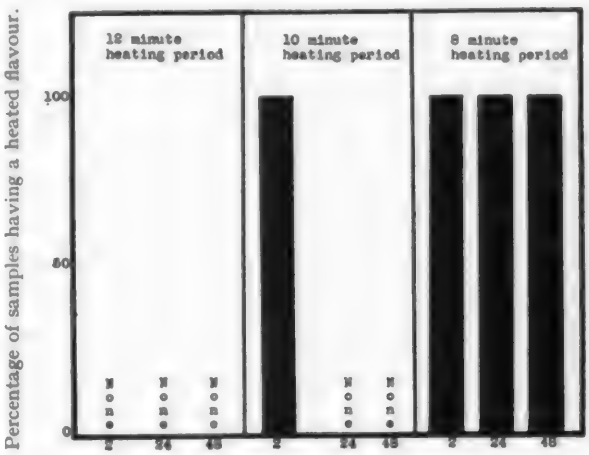
FIG. 6.—Effect upon heated flavours in cream by heating rapidly to 143° F. by increasing the steam temperature and pressure.



(Fig. 4.)



(Fig. 5.)


12 minute heating period
10 minute heating period
8 minute heating period
Percentage of samples having a heated flavour.
Age in hours of cream when tasted.

(Fig. 6.)

210° F. or above, the data were studied further. A heating period of 10 minutes appeared to be a critical time for the development of a heated flavour. For this reason a series of tests were made in the stainless steel-lined vat with flowing steam at 220° to 225° F. under pressure. This reduced the heating period to 8 minutes. This series was compared with two series heated with steam at 220° F. under pressure in 10 and 12 minutes respectively. The results are graphically presented in Fig. 6. The results show that heating cream with steam in the stainless steel-lined vat from 50° to 143½° F. in 8 minutes and holding for 30 minutes produced a heated flavour which was noticeable at 2-, 24-, and 48-hour testing periods. In a 10-minute heating period the heated flavour was noticeable at 2- but not at 24- and 48-hour ageing periods. When the heating period was extended to 12 minutes no heated flavours were detected in the cream. It is important to realise that the ratio of heating surface to the amount of cream decreases as the size of the pasteuriser is increased, so that such rapid heating periods could not be expected with the larger commercial units. The data indicate, however, that rate of heat transfer, temperature of the heating medium, and temperature of pasteurisation are all factors in imparting cooked flavours.

It appears from the heating trials that the heated flavour in cream pasteurised at 143½° F. is concerned directly with the rate of heating. This is true also when heating to 150° F.; however, the actual increase of 6½° F. in the temperature of the cream was very important in producing the heated flavour. The rate of heat transfer is slower in the glass-lined than in the steel-lined vat. For this reason the use of high-temperature heating medium is liable to cause less damage in the glass-lined than in the steel-lined vat, but differences of about 30° F. in heating medium temperatures appeared to be the limit of such variations.

It was not possible in this project to associate heated flavours with the presence or absence of film in the vats. The film, as already shown in Fig. 2, increased the heating period. The film contained 50 to 70 per cent. of fat in some cases. In other trials, especially in the steel-lined vat, the film was relatively free from fat. The fat-laden film was generally associated with a low-temperature heating water.

Milk or cream deposits or any other type of deposit which may adhere to pasteuriser linings are undesirable from several standpoints, and such accumulations ought to be carefully avoided.

Viscosity Results

Viscosity determinations were made on 68 samples, using a standardised No. 20 wire of the MacMichael viscometer. The samples and the instrument were at 36° to 40° F. (2·2° to 4·4° C.). Each determination was made on a 100 c.c. portion of cream stored in this quantity to eliminate the need for excessive mixing to secure a representative sample. The viscosity of the oils used to standardise the wire had been determined by the U.S. Bureau of Standards, and the operation of the viscometer was in accordance with the recommendations in Eimer and Amend's Bulletin No. 280.

In the present studies the raw 40 per cent. cream had viscosities with an interquartile range from 1,160 to 2,435 centipoises at the time of delivery. These values were increased from three to four times upon ageing for 24 hours at 40° F. The pasteurised cream at 2 hours with the upper and lower quartile values eliminated had a range in viscosity of from 78 to 110 centipoises. This range was increased from 140 to 205 centipoises after a 24-hour storage period, and from 160 to 278 centipoises after a 48-hour storage period. The above viscosities of raw 40 per cent. cream show the marked fluctuations even under comparable conditions. Marked decreases in viscosity resulting from pasteurisation are apparent. The tendency for both raw and pasteurised cream to gain in viscosity is also shown.

The results shown in Table I establish that pasteurisation at 150° F. decreased the viscosity of cream to a greater degree than did a temperature of 143½° F. when both temperatures were maintained for a period of 30 minutes. Furthermore, the viscosity of cream pasteurised at 143½° F. was greater after storage at 40° F. for 48 hours. An increase in viscosity ranging from 40 to 90 per cent. was secured when 40 per cent. pasteurised cream was held for 24 hours at 40° F. The increased viscosity ranged from 130 to 180 per cent. for the 48-hour ageing period. The percentage increases for both storage periods were calculated over the values obtained after 2 hours of storage.

The data presented in Table I are not extensive, but it is doubtful whether the pasteurised cream viscosity was influenced by the type of vat lining or the temperature of the heating medium.

Separation and Churning Experiments

An attempt was made roughly to associate heated flavours with the serum or fat. In one series milk was pasteurised in three lots and held for 30 minutes. The temperatures employed were 143½°, 150°, and 155° F. In a second series milk was pasteurised at 143½° and 170° F. and held for 30 minutes. In each series the lots of milk were separated into cream and skim milk at 110° F. All possible combinations of the raw and pasteurised skim milks and creams were made to produce milk which tested $5{\cdot}0 \pm 0{\cdot}2$ per cent.

In the first series all combination of skim milk and cream obtained from 143½°, 150°, and 155° F. pasteurised milk failed to produce even a trace of a heated flavour in the remade milk, probably due to the fact that milk pasteurised at 155° F. possessed only a trace of a heated flavour, which was lost in the remade samples.

Because of the apparent failure to trace heated flavours in the first series, milk was pasteurised at 170° F. in the second series. The milk pasteurised at 143½° F. again gave cream and skim milk which did not have a heated flavour and which made 5 per cent. milk free from a heated flavour. The mixture of 143½° skim milk and 170° cream produced a remade milk with a heated flavour. The 170° heated skim milk and the 143½° F. heated cream also produced a heated flavour in the remade milk. As would be expected, mixing the 170° heated skim milk and cream produced a remade milk

TABLE I.—EFFECT OF PASTEURISATION AND HEATING MEDIUM TEMPERATURES UPON THE VISCOSITY OF CREAM.

Pasteurisation Temperatures.		Temp. of Heating Medium.†	Viscosity of Pasteurised Cream in Centipoises.						Percentage Increase upon Ageing.*			
			Steel-lined Vat.			Glass-lined Vat.			Steel-lined Vat.		Glass lined Vat.	
			2 Hrs.	24 Hrs.	48 Hrs.	2 Hrs.	24 Hrs.	48 Hrs.	24 Hrs.	48 Hrs.	24 Hrs.	48 Hrs.
143° F.		160	110	—	278	—	—	—	—	152·7	—	—
		180	100	180	—	—	—	—	80·0	—	—	—
		210	120	205	—	112	210	—	70·8	—	87·4	—
		220	97	165	312	121	205	282	70·1	160·0	70·0	133·0
150° F.		160	70	—	195	—	—	—	—	178·5	—	—
		180	75	110	—	92	—	255	46·6	—	—	177·1
		210	—	—	—	88	160	—	—	—	82·0	—
		220	73	116	—	78	140	195	60·0	—	80·0	155·0

* These percentages represent the increase of the 24- and 28-hour samples over the 2-hour samples.
† Heating mediums at 210° F. included runs with water and steam. Those below 210° F. were water runs, and those at 220° F. were steam runs.

with the most pronounced cooked flavour. These trials indicated that the heated flavour in pasteurised milk was associated with both the fat and the serum.

Raw milk was separated and the cream and skim milk were combined so that the following fat contents were obtained: 0, 5, 10, 15, 20, 25, and 30. These remade samples were pasteurised at 160° F. and held for 30 minutes. Duplicate sets were run. Two judges indicated at 2-, 24-, and 48-hour intervals that the 0 and 5 per cent. samples were free from a heated flavour. Only occasionally was a trace of heated flavour found in the 10 per cent. sample. The 15, 20, 25, and 30 per cent. samples had a heated flavour. The intensity of the flavour increased as the fat content increased.

These results prompted a churning experiment designed to associate heated flavours with the fat or the solids adsorbed thereon. Raw cream containing 30 per cent. of fat was pasteurised at 145°, 160°, and 180° F. for 30 minutes. One part of each lot was churned at once, the other was cultured and churned after 24 hours. Churning conditions were comparable. The cream pasteurised to 145° F. was free from a heated flavour. The cream pasteurised at 160° F. had a heated flavour, while the 180° cream had a cooked flavour. The butter and buttermilks were tasted after 2, 24, and 48 hours of storage. At no time did the buttermilk from cream pasteurised at 145° F. have a heated flavour. There was a trace of heated flavour in the buttermilk from cream pasteurised at 160° F. after 2 and 24 hours' storage, but not after 48 hours. The buttermilk from cream pasteurised at 180° F. had a heated flavour which partially disappeared in 48 hours. The acid in the buttermilk procured from the cultured cream tended to cover up the heated flavour.

The butter samples prepared from cream pasteurised at 145° F. were free from a heated flavour. Those prepared from creams pasteurised at 160° and 180° F. had a pronounced heated flavour. The cooked flavour was prominent in the butter after 48 hours, but after 5 days the heated flavour had completely disappeared from all butter samples. The use of butter culture tended to cover up heated flavours.

The above churning results were verified in a duplicate series of cream heated to 240° F. under pressure for a period of 15 minutes. The autoclaved sample produced a buttermilk and butter with a pronounced characteristic heated flavour different from that secured with 180° F. pasteurised cream. In this series the buttermilks were analysed for fat, and then two separations were made to reduce the fat content of the buttermilk. The buttermilks contained from 2·0 to 2·5 per cent. of fat. One centrifuging and separation reduced the fat content to 1·0 to 1·5 per cent.; and the second treatment reduced the fat content to 0·1 to 0·2 per cent. of fat. The heated flavour was partially removed from the buttermilks by the removal of fat.

The butter prepared from cream pasteurised at 180° F. for 30 minutes was separated into fat and non-fatty portions. This was accomplished by centrifuging the melted butter. The butter oil and the butter serum both had the typical heated flavour, but it appeared to be least pronounced in the serum.

Conclusions

1. Heating cream containing 40 per cent. of fat to 150° F. with the heating medium at 210° F. or above in a stainless steel or a glass-lined vat produced a heated flavour. There was a tendency for this flavour to become less after a storage period of 48 hours at 40° F., but it did not always disappear.

2. Heating cream containing 40 per cent. of fat to 150° F. with water at 180° F. or below produced a heated flavour in 75 per cent. of the trials. This flavour always completely disappeared after a storage period of 24 hours at 40° F.

3. Heating cream containing 40 per cent. of fat to

(*Continued on page 251.*)

CELLULOSE CONTAINERS for MEAT PRODUCTS

by Frank Gerrard, of the Smithfield Institute

WITH THE ever-widening range of prepared foods now available, it behoves the meat products manufacturer to explore carefully the possibilities of presenting to the public attractive new meat packs in a uniform and hygienic fashion comparable with other food packs. Many people take exception, on æsthetic grounds, to the use of animal intestines as a container for meat. To those so minded it is futile to elaborate upon the technical processes of cleansing and preparing, and even the fact that the skins need not be eaten will probably have very little effect upon this prejudice.

"Synthetic" Casings

There are, moreover, several points definitely in favour of synthetic sausage and meat containers that the manufacturer cannot afford to ignore. These casings are made of regenerated cellulose from Egyptian cotton in a large range of varying sizes for the different types of sausage and meat packs. As they can be obtained in coloured form, the difficulty that arises in the dyeing of natural casings is obviated, a standard colour is obtained, and, if the manufacturer so desires, a name or trade mark may be printed on the casing.

Thus it is possible for a manufacturing house to handle a branded range of goods with all the attendant advantages accruing from such a practice. Owing to the practically non-hygroscopic character of cellulose, the "synthetic" casings do not provide a suitable medium for the proliferation of micro-organisms. This means that the possibility of mould growth is reduced to a minimum, and also tends to reduce the usual losses by evaporation that are associated with meat held in animal casings. Dehydration is a serious problem, as it not only affects the appearance, but also the texture and eating qualities of the goods. In fact, it is generally the practice to include added moisture in the mix to offset this loss. In the case of smoked sausage in cellulose cases, the smoking period, however, can be reduced, as the initial "drying time" is greatly decreased.

Uses of "Synthetic" Casings

It is the custom in the United States to use such containers not only for the many types of sausage normally manufactured, but also for jellied tongues, head cheese, souse, etc. These two latter products are a form of brawn that looks particularly attractive and should meet with a good demand in this country. Another popular line is a form of skinless small sausage such as Frankfurter, which is cooked in cellulose casings, the casings being removed previous to their exposure for sale. During the cooking process a very thin coat of a gelatinous nature is deposited upon the surface of the meat, giving the finished product an attractive semi-glazed appearance, far superior to that obtained with natural casings. Even in the case of fresh sausages or sausage meat a wrapper of a bright and translucent nature enhances their appearance. Small sausages

The illustration in the heading shows a Jellied Tongue wrapped in transparent tissue. It appeals to the eye by its colour as well as its shape, and wrapped in this way the keeping qualities are enhanced. (We are indebted to the Visking Corporation for the picture.)

such as Parisian and "Little Farm" look particularly attractive when wrapped in the transparent tissue, especially as this latter type of goods is somewhat difficult to present in a pleasing form in their normal linked fashion.

Methods of Preparation and Use

When preparing cellulose casings for cooked sausage, one end should be tied off with a soft cotton twine (football fashion) so that the casings do not become scored. As these casings are usually impregnated with a softening agent, they should not be dried off once they have been in soak, or a tendency to brittleness may develop. Generally speaking, fifteen minutes' soaking is sufficient. When filling out, the casing should be stretched to a little over 25 per cent. of its original diameter and the meat allowed to feed back over the filling nozzle to avoid air locks. If large sausages are being filled, a metal slide will greatly facilitate the process and will prevent the skins becoming damaged. Cooking should immediately follow smoking, and the temperature must not exceed 160° F. In this respect it is advisable to check thermometers periodically, as on many types of cooking thermometer it is possible for the tube to move, thus giving an incorrect reading. After cooking, a cold shower or immersion in cold water for a few minutes will greatly improve the finished appearance. When the casings are to be printed, yellow or white is recommended as most suitable for smoked or cooked sausage, and blue or brown is satisfactory in the case of liver and blood sausage.

Suggestions for British Tastes

Below are one or two suggestions for the summer trade, based generally upon American practice, but modified to suit British tastes.

Souse.

Pigs' head meat	25 lb.
Cooked tripe	4 ,,
Gelatine	10 oz.
Water	1 gal.
Sugar	4½ oz.
Salt	4 ,,
Vinegar	½ gal.

Cure head meat in sweet pickle for about five days, cook until tender, and cut to the desired size with the tripe. Scald off and mix the gelatine with the water and vinegar, adding the sugar and salt. Add this to the meat and fill into wide cellulose casings. Tie off and place into a rectangular shape.

Jellied Pork Loins.

Select small frozen loins, defrost by placing in cold running water, remove the bone, leave in a spiced brine for four days. Remove and drain, and when reasonably dry smoke in a dense oak smoke for three hours. After smoking, cook at 160° F. until tender. Cut the loin through the centre and pack into the container with the eye of the rib neatly tucked beneath the flap of the other loin. Fill up the crevices with a fairly firm gelatine and tie off.

Head Cheese.

Cured ox cheeks	12 lb.
Pigs' head meat	12 ,,
Onion	4 oz.
Ground white pepper	¾ ,,
Nutmeg	½ ,,
Ground marjoram	½ ,,
Pimento	½ ,,
Gelatine	1 lb.
Water	7 ,,

The meat should be well cured and cooked until tender. Cube up the meat, scald off all grease. Dissolve the gelatine in cold water, adding the seasoning and finally chopped onion. Heat the meat and stock to 170° F., skim off, and fill into wide cellulose casings.

PASTEURISED CREAM (continued from page 249)

143½° F. with water at 180° F. or below produced a product free from a heated flavour.

4. It was possible to heat cream to 143½° F. in the glass-lined vat with the heating medium at 210° F. without producing a heated flavour. A like procedure in the stainless steel-lined vat produced a heated flavour in 75 per cent. of the cases. This flavour always completely disappeared after a 40° F. storage for 24 hours. Apparently this rate of heating could not be exceeded without producing a heated flavour which did not disappear after 48 hours of storage at 40° F.

5. The presence of a heat-produced film on the wall of a stainless steel or glass-lined vat did not impart a heated flavour to the cream, but decreased the rate of heat transfer. Obviously, if this film had remained on the pasteuriser for an indefinite period, difficulty would have been expected in several ways.

6. The results of this study and a previous one clearly have shown that a heated or cooked flavour was more easily imparted to cream than to milk. Flowing steam not under pressure, or water at 210° F. for a glass-lined pasteuriser, or water at 180° F. for a stainless steel pasteuriser, appeared to be the hottest heating mediums which could be used without producing permanent cooked flavours. Washing the pasteurisers between batches of cream was found to be essential to secure maximum heat transfer.

7. The reduction in the viscosity of freshly pasteurised or aged pasteurised cream was greater when a temperature of 150° F. was used than when 143½° F. was employed. The viscosity of the pasteurised cream tended to increase in viscosity for 48 hours at 40° F.

8. Separation and churning trials demonstrated that the heated flavour in cream was associated to a greater degree with the fat than with the serum solids, although both were affected.

INDUSTRIAL NEWS

Sir William Beveridge Chairman of Food Supply Committee

Sir William Beveridge has been appointed chairman of a special sub-committee to plan the organisation of food supplies for the civil population in time of war. The reference of the sub-committee is limited at the present stage to the consideration of arrangements for rationing the supply to the individual consumer in case of necessity and of the preparatory steps which might be taken to enable such arrangements to be brought into force as quickly as possible.

Sir William Beveridge, who is Director of the London School of Economics, is 57 years of age. He was at the Ministry of Food during the war, being later appointed Permanent Secretary.

British Standards Institution Annual Meeting and Luncheon

The Annual General Meeting of the B.S.I. was held at the Institution of Mechanical Engineers, on June 4, under the Chairmanship of Mr. W. Reavell, M.I.Mech.E., and a large number of members were present. Before commencing the business of the meeting a very warm tribute was paid to the late Sir Archibald Denny, Bart., who was one of the pioneers of this National Movement of Standardisation. Mr. Reavell, in reporting on the progress of the work during his year of office, made reference to the arbitration in connection with the standards to be adopted in this country for the 16 mm. sound films, and mention was also made of the forthcoming visit of the Director to New York and the Argentine in connection with the work of the newly formed Argentine Institute for the Rationalisation of Materials.

At the luncheon at the Royal Automobile Club, which followed the meeting, the Rt. Hon. Lord Riverdale, K.B.E., who was the chief guest, proposed the toast of the Institution. Mr. Reavell, the retiring Chairman; Mr. E. J. Elford, the Chairman for the forthcoming year; Mr. S. Tatchell, F.R.I.B.A., Chairman of the Building Industries National Council; and Colonel Briggs, of Unilever, Ltd., also spoke.

▼ ▼ ▼

Messrs. R. Hugh Holt and Co. have removed from 220, Tower Building, Water Street, Liverpool, to 33, Mossley Hill Road, Liverpool 18.

[*Russell.*

Sir William Beveridge.

National Mark Scheme for Fruit Juice Syrups

The Minister of Agriculture and Fisheries has given notice of his intention to make the undermentioned regulations prescribing grade designations and grade designation marks for fruit juice syrups:

Agricultural Produce (Grading and Marking) (Fruit Juice Syrups) Regulations, 1936.

Copies of the draft regulations may be obtained, price 1d. (post free 1½d.), from His Majesty's Stationery Office, Adastral House, Kingsway, London, W.C. 2, or through any bookseller.

New Scottish Creameries

A new creamery is to be built at Mauchline, Ayrshire, for the Scottish Milk Marketing Board, 95, Bothwell Street, Glasgow. The new building will cost about £50,000, and will be of reinforced concrete and brick.

The Scottish Co-operative Wholesale Society are to take over the Galashiels and Innerleithen creamery on May 9.

Alfa-Laval Co., Ltd.

In connection with the purchase of British Separators, Ltd., by the Alfa-Laval Co., Ltd., it is announced that Messrs. R. H. Dolton and H. Mackegg have been appointed to the board of the Alfa-Laval Co., Ltd.

Food Group at Southport Health Congress

The Health Congress of the Royal Sanitary Institute is to be held at Southport during the week beginning July 6, 1936, and the Food Group of the Society of Chemical Industry has accepted responsibility for Section F.—Hygiene of Food—the President of which is the Group's Chairman, Dr. L. H. Lampitt.

The following programme will be carried out on Thursday, July 9, at 10 a.m., in Art Gallery V., Municipal Buildings.

1. PRESIDENTIAL ADDRESS.

L. H. Lampitt, D.Sc., M.I.Chem.E., F.I.C.

2. DISCUSSION ON "FOOD PACKAGE AND THE CONSUMER."

(*a*) "The Effect of Coloured Papers on Bacteria," by D. H. F. Clayson, B.Sc., F.I.C. (Messrs. J. Lyons and Co., Ltd.).

(*b*) "The Effect of Coloured Wrappers on the Fat of Fatty Foods," by W. L. Davies, M.Sc., Ph.D., F.I.C. (National Institute for Research in Dairying, Shinfield, Reading).

(*c*) "The Physical Aspects of Food Package."

(i.) Wrapping Papers in General, by G. E. Forstner, M.Sc., A.I.C. (Messrs. J. Lyons and Co., Ltd.).

(ii.) Tin Cans, by F. Hirst, M.Sc., A.R.C.S., Director, Fruit and Vegetable Preservation Station, Campden, Glos.

(*d*) "The Packaging of Food from the Public Health Point of View," by J. B. Howell, M.R.C.S., L.R.C.P., D.P.H., Medical Officer of Health, Hammersmith.

Empire Health Exhibition at Portsmouth

The arrangements for the Empire Health Exhibition to be held at Portsmouth from September 14-19, and organised by the Central Council for Health Education, have now been completed. The Exhibition will be opened by the Minister of Health, the Right Hon. Sir Kingsley Wood, P.C., M.P., and it is said that it will be the largest health exhibition ever held in England outside London.

▼ ▼ ▼

Mr. R. V. Rowles, M.Inst.Mech.E., and Mr. F. James Fielding have been elected to the Board of Directors of Messrs. Fielding and Platt, Ltd., the old-established firm of Gloucester engineers.

W. B. Chivers Re-elected President of Canners' Association

At the annual general meeting of the Fruit and Vegetable Canners' Association of Great Britain, held at 22, Buckingham Gate, London, S.W. 1, on May 27, Mr. W. B. Chivers was re-elected as President. Mr. G. C. F. Salmon a Vice-President, Mr. V. Wolton was appointed as Chairman, and the retiring members of the committee, Mrs. E. H. Gasking, Mr. H. D. Gregson, and Mr. L. G. Wall, were re-elected.

New Irish Biscuit Factory

The work of demolition of the old Bloomfield bakery at Belfast has been completed, and work will now be pushed on rapidly on the construction of the new biscuit factory for Messrs. Inglis and Co. The new premises will have a two-storey frontage with a shop for retail sale. An attractive modern design has been prepared.

Refrigerating Equipment

The Liverpool Refrigeration Co., Ltd., Polar Works, Sankey, Warrington, have received from the Burntisland Shipbuilding Company the order for the refrigerating equipment to be installed on ship No. 204. Included is a "Polar-Ellarcold" Methyl Chloride plant. The insulation of the cold chambers is also being carried out under the supervision of this company.

They have also received through H.M. Office of Works the order to supply a fully automatically controlled refrigerating plant for the Department of Scientific Research Station, Harmondsworth. The plant includes a "Polar" Sleeve Valve Single Cylinder Compressor, direct coupled to electric motor. The insulation of the various cold chambers is also being carried out by this company.

Mr. T. B. Scotcher leaves Grape-Nuts Company

The Grape-Nuts Company announces with sincere regret the resignation of Mr. T. B. Scotcher, who has been managing director for the past eight years. Mr. Scotcher is joining Lipton, Ltd., as director and general manager, and the Grape-Nuts Company wish him well in this new work.

Mr. R. T. Mohan, who is a Canadian, and has been for the past twenty-two years associated with the Canadian and British interests of General Foods Corporation, is at present in England and is taking over the direction of the Grape-Nuts Company.

Death of Mr. John Dundas

George Scott and Son (London), Ltd., and Ernest Scott and Co., Ltd., announce with deep regret the sudden death of Mr. John Dundas, who since 1915 rendered incalculable service and guidance as Chairman of the companies.

He is succeeded by Mr. Alexander McLean Ewing, who has for a number of years been a Director of the companies. Mr. Ewing is a man with wide interests, being a Director of George Outram and Co., Ltd., proprietors of *The Glasgow Herald*, etc. He is Vice-Chairman of the Press Association, Vice-Chairman of Reuters, and Director of a number of other companies.

The vacancy on the Board has been filled by the appointment of Mr. George William Riley, who has for many years been chief of the technical staff of the Scott companies. He is a well-known authority on evaporation, distillation, drying, etc., and has been responsible for a number of the patent plants and processes which are being developed by the companies.

Steel Cable Plates

G. A. Harvey and Co., Ltd., have supplied 8½ miles of "Harco" perforated steel cable plates for fixing the electric wires and cables of the *Queen Mary*. These perforated plates enable cables to be fixed rapidly and efficiently without the expense of drilling.

Hartley Share Offer

The old-established business of William P. Hartley, Ltd., marmalade and preserve manufacturers and canners of fruit and vegetables, has been converted into a public company. The new company has a capital of £1,000,000, divided into £500,000 5 per cent. cumulative preference shares of £1 each and 2,000,000 ordinary shares of 5s. each. The offer to the public consisted of the whole of the preference shares, which were issued at 21s. 6d. each, and 500,000 ordinary shares, the sale price of which was fixed at 8s. each; the balance of the ordinary shares were allotted as part of the consideration for the sale of the business.

Extensions to Biscuit Firms

The Fifteenth Annual General Meeting of the Associated Biscuit Manufacturers, Ltd., was held on June 10, at the Hotel Victoria, London, W.C., and the Chairman, Mr. C. Eric Palmer, J.P., in his speech, said: "You will be interested in learning that extensive schemes are in hand at Huntley and Palmers, Reading, and Peek, Frean and Co., Bermondsey, for the improvement of their buildings."

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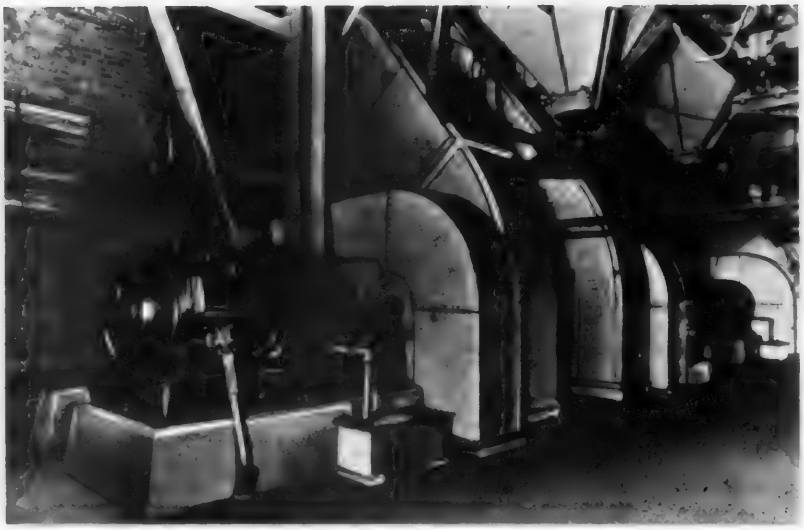
Sutcliffe, Speakman and Co., Ltd., makers of activated carbon for solvent recovery and gas masks, have acquired additional extensive premises to augment their output and fulfil their contracts.

Erratum

We inadvertently gave in the May issue of FOOD MANUFACTURE £600 as the sum required for the guarantee fund being raised by the British Chemical Plant Manufacturers' Association for the Chemical Engineering Congress of the World Power Conference and £400 as the amount already paid or promised. These figures should have read £6,000 and £4,000 respectively.

Mr. W. M. Cameron, Vice-President of the Cameron Can Machinery Co. of Chicago, U.S.A., photographed in our offices during his recent visit to this country. Mr. Cameron mentioned two interesting projects—a beer can in process of production by the Cameron Can Company which will be different in type from the two cans already on the market in the U.S.A., and a vacuum double-seam pack for cornbeef, with a compound seal in which Mr. Cameron says all the cornbeef in the Argentine will be packed within the next five years.



An industrial application of "Sirocco" Forward-Bladed Fans operating in parallel supplying induced draft for boilers. This illustration appears in a new publication of Davidson and Co. Ltd., mentioned on the next page. (The North-Eastern Electric Supply Co. Ltd.)

Bakery Machines

The Filler Machine Co., Inc., of Philadelphia, U.S.A., manufacture a number of bakery machines, including Cake Scaling machines, Cake Batter Depositing machines, Cake Slitters, and Automatic Cake Cutting machines.

The Cake Scaling machines have slow-moving parts but speedy production, as multiple outlets discharge the batter at one time. Side arms draw the dough into cylinders by suction and discharge the desired amount accurately into pans which are automatically conveyed under the outlets, these outlets being large enough to prevent pressure on the batter so that its quality is not destroyed. In addition the machine has *spreaders* which discharge the batter in such a manner that the dough is spread over the entire surface of the pans and prevents the necessity of further spreading by hand.

Morris Tiering Machine

The tiering machine manufactured by Herbert Morris, Ltd., can be used for handling barrels, kegs, pipes, or tuns. The machine picks the barrel off the floor, raises it to the right level, moves it to the required position, and then gently eases it into its proper place in the rack.

Modern ideas will not countenance the waste of floor-space involved in putting barrels only one deep in a high warehouse, nor will it admit the possibility of making mistakes by means of a higgledy-piggledy arrangement of stocks. With one of these tiering machines and an easily constructed rack barrels, kegs, etc., can be set in orderly rows one above the other.

A Capacitor-Induction Motor Without Brushgear

The "Red Band" Fractional Horse-power Motor made by Messrs. Laurence, Scott and Electromotors, Ltd., for a number of years, has been redesigned, and is now free from the usual complications of starting gear on the rotor. In the new machine the latter is of the simple squirrel cage type, free from slip-rings, brush lifting mechanism, etc. The starting device provided takes the form of a contactor mounted on an accessible position in an enclosure in the end bracket. When the machine is switched on, the starting current automatically causes the contacts to close, which switches the condenser into circuit. The machine then runs up to speed, and when the current falls below a predetermined amount the contacts open, and the motor runs as an induction motor. If an overload of about 250 per cent. or more should occur, the contacts close again and the machine runs as a capacitor motor until the overload is removed, or the protective device (fuse or automatic circuit breaker) operates. The contactor is of simple, robust design with heavy tungsten contacts. It has been tested to start a motor over *one million* times against twice full load torque, and at the end of the test was in perfect condition. This is equivalent to 30 starts an hour, 24 hours a day for nearly four years.

Pioneer Sales and Publicity Contractors, Ltd.

A service scheme has been introduced by Pioneer Sales and Publicity Contractors, Ltd., for the promotion of sales by salesmen placed in an area selected by the manufacturer, window displays, door-to-door distribution of samples, and the fixing and maintenance of glass plates and tablets.

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Thomas McLachlan, A.C.G.F.C., F.I.C., Public Analyst and Consulting Chemist, has taken over the practice of Mr. A. J. de Hailes. He will carry on both practices at his own address, 10a, Featherstone Buildings, High Holborn, W.C. 1.

An unusual application of the stacker made by Herbert Morris, Ltd. The heavy galvanised bins are kept in steel racks, and the process of getting these bins in and out of the racks would be extremely laborious without the assistance of the stacker. The work is greatly assisted by the fitting of ball-bearing rollers to the lifting platform.

TRADE LITERATURE RECEIVED

"Sirocco" Fans

Davidson and Co., Ltd., have sent us a copy of their new publication entitled "*Sirocco*" *Centrifugal Fans with Forward-, Radial-, and Backward-Bladed Classes of Fan Wheels.* The booklet has been very well produced and contains a number of illustrations and graphs.

The various classes of "Sirocco" centrifugal fans are described and their individual features and suitability for different requirements indicated. Centrifugal fans are divided broadly into three classes determined by the design of blading of the fan wheel—viz., (1) with blades inclined forward in the direction of rotation, (2) with blades set radially relative to the direction of rotation, and (3) with blades inclined backward from the direction of rotation. For a specific pressure a backward-bladed fan will run at a higher peripheral speed than a radial-bladed fan, and a radial-bladed fan at a higher peripheral speed than a forward-bladed fan. The booklet then goes on to review each class in detail, giving notes on the characteristic features, performance, design, efficiency, operation, etc.

Credit for Agriculture

Agriculture Britain's Basic Industry is the title of a booklet recently issued by the United Dominions Trust, Ltd., and deals with the company's scheme for granting credit to farmers who wish to restock their farms, modernise them, build farm roads, and renew the farmyards.

The booklet shows how the U.D.T. farm credit service works as applied to livestock, deadstock, improvements to lands and buildings, and also gives short notes on assistance to landlords, market gardening and horticulture, breed societies, and auctioneers.

Flavours and Bakers' Specialities

Numerous formulæ for the manufacture of flavours and bakers' specialities are described in detail in an attractive book of formulæ and recipes just published by the Glyco Products Co., Inc., New York. Recipes are given for jellies, pie fillings, marshmallows, cake mixes, icings, and flavours.

A copy of the booklet will be sent free on request to all interested in the manufacture of flavours and other products used in the baking industries.

The stream-lined combined patent "Rapid" Sifter and Mixer specially constructed of stainless steel which was recently supplied by Wm. Gardner and Sons (Gloucester), Ltd., to Messrs. Joseph Lingford and Son, Bishop Auckland, Co. Durham, for making their special baking powder.

"Autoset" Sales, Ltd.

We have received a new loose-leaf catalogue issued by "Autoset" Sales, Ltd., drawing attention to the castors, trucks, and wheels, etc., made by this company. The castors are made in a large variety of sizes and types, the standard sizes being supplied up to a carrying capacity of 10 cwt. per castor and with wheels 1½ in. to 16 in. diam. The "Autoset" wheels do not spin as the bearings are grease-packed, and in the rubber wheeled types no further lubrication is required until the wheels require replacement. The catalogue draws attention to the fact that the load-carrying capacity of any given castor is not in itself indicative of its suitability, other factors such as type of floor, conditions of usage, etc., must be taken into consideration. A copy of this catalogue will be sent to any reader of FOOD MANUFACTURE who is interested.

The Book of Wolverhampton

The Wolverhampton Industrial Department Association has published a most attractive book, dealing with the history, industrial development, local trades, municipal activities, residential amenities, etc., of Wolverhampton. The book is bound in cloth and is extremely well printed and illustrated throughout.

Variable Speed Gear

Flender variable speed gears of different sizes, speed ranges, and h.p. ratings are described in a booklet published by Hansel and Schmitt, engineers. The Flender provides a complete range of speeds between predetermined limits and assures precision in speed selectivity even to a fraction of 1 r.p.m. It is completely enclosed, simply constructed, and maintenance costs are low. The booklet contains a description of the construction of the gear and is illustrated by photographs of factory installations.

Corrosion Resisting Plant

A new loose-leaf booklet entitled *Corrosion Resisting Plant for Foodstuffs and Dairy Industries, Pharmaceuticals, etc.*, has been issued by John Thompson (Dudley), Ltd. The booklet is well illustrated with food plant, including stainless steel plant, sterilisers, cooking retorts, mixers, dryers, etc. The descriptive matter gives a brief history of the company, a note on the special department fabricating plant for foodstuffs factories, and then deals interestingly with the illustrations throughout the booklet. The company is not confined to the manufacture of plant in any one particular metal.

BRITISH CHEMICAL PLANT

Five Years of Progress

THE British Chemical Plant Exhibition was opened at the Central Hall, Westminster, on Monday, June 22, at 11 a.m., the ceremony being performed by the Lord President of the Council, the Right Hon. J. Ramsay MacDonald, M.P. In his introductory speech Mr. J. H. G. Monypenny, Chairman of the British Chemical Plant Manufacturers' Association, stated that all the plant exhibited was of British manufacture, the criterion laid down being that at least 75 per cent. of the cost of production of an exhibited item should represent British labour and/or material.

Mr. MacDonald remarked that the application of science to industry was more than ever necessary to-day. Laboratory processes were being rapidly translated to an industrial scale. This evolution would undoubtedly continue, and the progress to be made in the future would prove as great as any of the past. He had visited many works and seen British engineering in the plenitude of its power, so that he could anticipate what he would see in the Exhibition. He said that the chemical engineer had a wide field open for cultivation, upon which the economic fabric of the State was largely dependent. In conclusion Mr. MacDonald welcomed "our foreign friends" and made an appeal for the continued co-operation of science for the general benefit of mankind. Science was not meant to be divided into camps hostile to each other. He then formally declared the Exhibition open.

A vote of thanks to Mr. MacDonald was very appropriately proposed by Dr. H. J. Bush and seconded by Mr. W. Russell, who made a strong plea for increased confidence of the plant user in submitting details of his requirements to the plant manufacturer.

The Luncheon to mark the inauguration of the Exhibition was subsequently held at the Hotel Victoria, Northumberland Avenue, Mr. J. H. G. Monypenny again presiding.

Sir David Milne-Watson, Chairman of the Organising Committee of the Chemical Engineering Congress, proposed the "British Chemical Plant Exhibition". He said that in thinking over the part played by the applied chemical industries in the life of modern business and modern communities he had been struck by the ceaseless search for new substances and new products which was so marked a feature of this age. Between the laboratory, where fundamental changes were wrought, and the daily lives of the people stood the chemical engineer, whose task was the translation of research work into practical productive plant. Sir David then mentioned the rapidity with which new chemical discoveries and improvements were put into commercial practice. The Chairman responded to this toast.

Mr. E. A. Alliott, past Chairman of the British Chemical Plant Manufacturers' Association, proposed the toast of "The Guests", which was replied to by the Right Hon. J. Ramsay MacDonald, M.P., Lord President of the Council, Dr. C. M. A. Stine, Vice-President of E. I. du Pont de Nemours, and Professor Dr. Kessner, Vice-President of Dechema.

The stands of the firms exhibiting at the British Chemical Plant Exhibition took up the ground floor and the basement at the Central Hall, Westminster. All the space was taken, and the Exhibition could have been made larger were room available. However, other considerations, such as the desirability of holding the Chemical Engineering Congress at the same time, under the same roof, had to prevail. In spite of the limitations enforced by the restricted space, the Exhibition certainly demonstrated that great progress has been made in British chemical plant engineering in recent years. The display of plant and equipment on the various stands showed marked improvement in presentation since the previous Exhibition in 1931. An inspection of the exhibits proved that British plant and equipment for every purpose, including, of course, many exhibits of interest to the food industry and of the highest quality and efficiency, is now obtainable.

A full report of the Exhibition dealing with the exhibits of interest to the food industry is published in the June 26 and July 3 issues of *Food Industries Weekly*.

EXHIBITION REVIEW

An illustrated review of all the Chemical Plant Exhibits of interest to food manufacturers appears in consecutive numbers of *Food Industries Weekly* published on June 26 and July 3.

CONGRESS REPORT

Papers and discussions particularly concerning manufacturers of foodstuffs will be specially described by well-known chemical engineers in the August number of *Food Manufacture*.

CHEMICAL ENGINEERS in CONFERENCE

International Gathering in London

ALTHOUGH the number of papers presented during the week of the Chemical Engineering Congress in London (June 22 to June 27) totalled 127, without counting any sub-divisions, the discussions that took place by no means bring to an end the tremendous amount of work that goes to the organisation of an international congress of this nature. (Copies of the papers and discussions will be published in the form of transactions, but this will necessarily take some time. Members of the Congress were afforded special facilities for purchasing copies.) Discussions of these papers and of the observations made by the members of the Congress will go on for a long time, and the valuable information and data communicated will serve a very useful purpose in factories and laboratories throughout the world.

That the first world congress in chemical engineering could command such a variety of communications from every industrial country in the world is significant that the chemical engineer is receiving world-wide recognition of his work. The chemical engineer is, in fact, the natural result of the rapid expansion of chemical and allied industries during this century. A close liaison between chemist and engineer became necessary in order to translate the results of laboratory research into practical production with the minimum of delay to satisfy the demands of progress, the tempo of which has become increasingly fast in recent years. The chemical engineer is one of the outstanding products of this century, and we no longer regard the chemical process (whether it be a purely chemical synthesis or the preserving of foodstuffs) as an operation over which the chemist or the engineer wrangle as to responsibility for its development or progress. We have come to expect information concerning such processes to be expressed in chemical engineering language which is intelligible to the chemist, the chemical engineer, and the engineer, all of whom play a very important part in industrial endeavour.

The Congress, held in the Central Hall, Westminster, was officially opened by H.R.H. the Duke of Kent, who observed in his speech that it was twelve years since his brother, the King, then Prince of Wales, opened the first World Power Conference at Wembley, under the ægis of which this conference had been organised. Lord Leverhulme, who presided, drew attention in his address to the fact that the association of chemical engineering with the World Power Conference was not fortuitous. The contents of the papers read showed what a close relationship exists between them. "The energy requirements of a chemical process are a fundamental consideration in its translation to a works scale." "The chemical engineer conserves the resources of the world in a diversity of ways." "In years to come it will be precisely for this conservation of our resources that the chemical engineer will receive the greatest recognition from a world wherein the gradual exhaustion of nature's resources is being accelerated by the increasingly heavy demands made upon them." Such were the conclusions drawn by Lord Leverhulme, and his address was followed by short speeches from the official delegates of foreign governments.

Members of the Congress and their guests were afforded a round of hospitality and works visits in connection with the Congress and with the British Chemical Plant Exhibition, which was especially enjoyable for the international goodwill it created. At one of the functions at least, when dancing was in full swing, we overheard someone saying: "Of course, with so much catalyst present the reaction always goes on rapidly." But the chemical engineer, as the youngest of all types of scientific worker, is perhaps entitled to be somewhat irrepressible yet!

Reviews of several of the papers and the discussions, of particular interest to food manufacturers, specially contributed by prominent chemical engineers who were connected with or who attended the Congress, will be published in FOOD MANUFACTURE next month.

BOOK REVIEWS

The Chemistry of Milk

When one studies the vastness of the field and realises the enormous amount of work that has been done and the results of which the author has collected in this book, it is apparent that for the research worker and chemist engaged in dairy chemistry, *The Chemistry of Milk* is a work that should prove invaluable. In the present volume there are over 500 pages, divided into five parts and subdivided into twenty-two chapters, which admirably cover the entire field from the composition of milk, its constituents, its physical characteristics, chemistry, processing and nutritive value.

These chapters cover all the branches of the industry and from the theoretical side fill the gap for the collection of materials admirably. In view of the great improvements and alterations which are taking place almost daily, the author has wisely refrained from commenting too much on the present-day equipment. From a close study of this book it is possible to see the great improvements which have already taken place in the milk industry, and it is to be hoped that this book will give a further impetus to the industry so that we can all hope for pure milk in the near future.

One feels, however, that it would have further increased its value by the inclusion of the latest method of analysis, for here again are the noticeable variations in methods and scattered literature, and an attempt to standardise the methods of analysis and bring them right up to date would have been of very great assistance.

Apart from this, one must compliment the author on his very comprehensive survey of the literature and the large number of references at the end of each chapter. Attention is drawn to the chapters on milk condensing and drying, and in the latter all the various methods are concisely described. Both the subject index and the authors index are very carefully done. It is one of the series of monographs which are being published by Messrs. Chapman and Hall, and fully maintains the excellence of forerunners in this series.

H. W. A.

The Chemistry of Milk. By W. L. Davies, Ph.D., M.Sc., F.I.C. Vol. X of a Series of Monographs on Applied Chemistry, under the editorship of E. Howard-Tripp, Ph.D. Chapman and Hall, Ltd., London. Pp. 522+xii. Price 25s. nett.

A Hundred Years Ahead

Mr. C. C. Furnas, Associate Professor of Chemical Engineering at Yale University, U.S.A., visited the International Exposition recently held to celebrate the centenary of Chicago —the Century of Progress Fair—and spent considerable time in the Hall of Science. But he came away disappointed "because so little has really been accomplished and there is still so much to be done". And so the Professor returned home to write a book, not about what he saw at the Fair, but on what was not to be seen at the Fair. A book on developments he would have liked to have seen and what he hopes and thinks the world will see in the coming century of scientific development. His views are expressed in *The Next Hundred Years. The Unfinished Business of Science.*

The book is written for "the man in the street". It ranges in subjects from Eugenics to Economics, and it covers foodstuffs on the way. Little of technical value for the food manufacturer will be found in the book despite the fact that there are chapters entitled "Food Manufacture", "Food", "Agriculture is an Industry", and "The Perfect Farm", although these chapters and parts of many others are extremely interesting from a prophetical point of view. The chapter on "Food Manufacture" deals for the most part with the future of synthetic foodstuffs, and Mr. Furnas states that "We are a long, long way from protein manufacture, for the chemist has not pointed the way as yet. The structure of only the simplest proteins has been established and the complex animal proteins are still in a hopeless tangle. The unravelling apparently lies years and years in the future, so far ahead that most protein chemists will not talk about it. The chances are that when you pass from this earthly existence you will do so without having had an opportunity to dine on synthetic steak and onions." (Not synthetic onions, we hope.) He makes such amusing, if not pertinent, remarks as, "Food appeal is as subtle and essential as sex appeal".

S. T.

The Next Hundred Years. The Unfinished Business of Science. By C. C. Furnas. Cassell and Co., Ltd. Pp. 366. Price 8s. 6d.

CORRESPONDENCE

Mineral Water Preservatives

From R. Harold Morgan, M.Sc.

In your article on mineral waters and their manufacture in the current issue of the journal there appears to be some misunderstanding regarding the amount of preservative allowed. It is mentioned in the last paragraph that blackcurrant juice can contain 1,500 parts per million of sulphur dioxide. As a matter of fact, this is incorrect, for, while the preservative regulations state that this juice (or pulp) can contain 1,500 parts per million of sulphur dioxide for conversion into jam or crystallised, glacé, or cured fruit, fruit or fruit pulp not otherwise specified in the schedule is limited to 350 parts per million.

R. Harold Morgan.

[The author of the article "Mineral Waters and Their Manufacture" in last month's issue of Food Manufacture acknowledges the error in respect of the amount of SO_2 present in blackcurrant juice, and thanks Mr. Morgan for pointing it out.]

Nitrite in Meat

From H. H. Stephenson

Sir,—In Food Manufacture, 1935, June, 188-189, there is a composite article by Messrs. Osman Jones, Callow, Crosbie-Walsh, and J. W. Black to the effect that direct addition of nitrite is not permitted in Britain, but is permitted in imported meats and bacon. I am not concerned to oppose their thesis that the Preservatives Regulations of 1925 were not intended to operate in restraint of reasonable modifications of approved existing processes. But it is said that *as little* (italics mine) as 500 parts per million is sufficient to produce red, and that cured bacon contains only 300 parts nitrite per million of meat. These figures are equivalent to 3·5 and 2·1 gr. per lb. I should like, therefore, to point out that although Australia permits direct addition of nitrite, the total (direct and bacterial) must not exceed 1 gr. per lb. as KNO_2.

H. H. Stephenson.
Of the Sydney Meat Preserving Co., Ltd., Auburn, New South Wales.

Dr. van Raalte's private laboratory at Rotterdam.

TESTING FOODSTUFFS in HOLLAND

A description of the Amsterdam Municipal Laboratories visited recently by the Food Group of the Society of Chemical Industry.

By A. M. MAIDEN, B.Sc., Ph.D., A.I.C.

IT WAS very fitting that arrangements should have been made for the Food Group during its recent visit to Holland to inspect one of the Dutch establishments charged with the maintenance of quality in food from the point of view of the consumer, as well as factories whose business it is to make money from the sale of food. The full title of the laboratory chosen, "Keuringsdienst van Waren voor het Gebied Amsterdam," means literally the "Food inspection department for the district of Amsterdam". It is under the very able direction of Dr. van Raalte, and is one of the largest of the twenty-one public health laboratories which cover the whole of Holland. It employs fourteen whole-time inspectors.

Dr. Straub's Lecture

After Dr. van Raalte had welcomed the party, Dr. Straub gave a short lecture, in which he very briefly described the work done. He pointed out that they were on very friendly terms with the manufacturers, and, in fact, part of their work was to ensure that inter-factory competition was on an entirely fair basis. There is no difficulty in undercutting a rival, for instance, if the standard of quality demanded is not kept, or if short weight is given. Such laboratories have been in existence in Holland for forty-three years, and their educational work has been so well done that they now find that most infringements of the law are of a very minor nature, such as mislabelling. In most cases of such infringements it is sufficient to get in touch with the manufacturers concerned, and legal action is only taken in cases of flagrant contravention of the laws, in which conviction is practically certain. For instance, this laboratory analyses some 34,000 samples of milk and foods a year. The number of infringements found averages between 3,000 and 4,000; in 500 cases only is the matter taken to court, and out of these 500 cases convictions are obtained in about 490. The position in Holland is rather simpler than in this country, for the whole situation is codified, and the laws, official standards, and the official methods of analysis are published in book form, the *Warenwet*. In all cases the standards chosen have been selected so that they permit of ready analytical control.

It was interesting to learn that the determination of the freezing point of milk for the detection of added water has been used in Holland for twenty-five years, that the courts will convict on proof of a water content of 2 per cent. beyond the upper limit allowed, and that there is no "appeal to cow". The sixty milk pasteurising plants in Amsterdam are all under the control of this laboratory. The milk from each plant is examined bacteriologically once every week.

Testing Port Wine

At the present moment the laboratory is paying particular attention to the question of port wine. Apparently there are a very large number of artificial port wines on sale in Holland, often of a very low quality, and it has been found that these always contain oxymethylfurfurol and have a high invert sugar content. Hence a relatively large number of estimations of these substances are being carried out on port wine at the moment.

Dr. Straub pointed out that although a very large extent of the work of a Public Health Laboratory is destructive, a certain amount of research work is being carried out here. For instance, they have recently been investigating the remarkable process for the preservation of raw milk by which it is claimed that raw milk can be kept in perfect condition for months if maintained at 6° to 8° C. under an oxygen pressure of 10 atmospheres.

The Laboratories

The laboratories themselves are situated in an extraordinarily fine modern building in the Keizersgracht, on one of the most pleasant canals of Amsterdam. Some idea of their amenities can be realised from the name of one of the floors—"Garden floor"—and a very nice garden it is. All the rooms are very spacious, airy, and

light, the whole place is equipped with the most modern apparatus, and, being in Holland, everywhere, of course, is spotlessly clean.

It would now, perhaps, be better to describe the various laboratories as visited by the writer's party. In the first laboratory we saw the examination of milk bread. In Holland milk bread must be made from full-cream milk with only 10 per cent. of extra water. Milk bread is accordingly tested for milk fat and lactose content. The milk fat is determined by hydrolysing the crumb with hydrochloric acid, extracting the residue obtained on filtration of the hydrolysate, which contains all the fat, in a Soxhlet with petrol ether, and determining the amount of milk fat thus extracted by the Kirschner method or the xylene method (van Raalte, *Chemisch Weekblad*, 1927). Lactose is estimated by extracting the soluble sugars from bread crumb, removing maltose and sucrose from the extract by fermenting with yeast and estimating the lactose remaining with Fehling's solution. In this laboratory we also saw Jansen's apparatus for the detection of preservatives such as salicylic acid in foodstuffs by fractional sublimation (Jansen, *Chemisch Weekblad*, 1936).

Interesting Pieces of Apparatus

One very noticeable thing was the number of "tips" that could be picked up. For instance, this laboratory uses vulcanite colorimeter and polarimeter tubes (Straub, *Chemisch Weekblad*, 1934). These tubes, which are made in the mechanics' shop on the premises, are practically indestructible, and have the great advantage of being light-proof on the sides. Another piece of apparatus which the author had never seen in England was designed for the continuous extraction of one liquid by another, being made in two forms according to whether the extracting liquid was lighter or heavier than the liquid to be extracted. Also in the milk laboratory the tube containing the milk for the hydrometer test was hung on gimbals, thereby minimising any tendency for the hydrometer to touch the walls, a common habit of hydrometers, especially when they are used in measuring cylinders which are not quite plumb. And another very simple idea was the use of bronze stopcocks in burettes containing caustic. We were assured that they never stick.

The apparatus used in these laboratories for the determination of the freezing point of milk is very simple in construction, and the cooling bath merely contains a mixture of ice and saltpetre. Dr. van Raalte assured us that, although so simple, it had been found perfectly satisfactory in years of use, and he could never understand why we were so slow to adopt this test.

Bacteriological Standards for Milk

The bacteriological standards for milk are fairly stiff—pasteurised milk, no *B. coli* in infinity, total count not to exceed 25,000 per c.c.; "graded" or "model" milk, no *B. coli* in 0·01 c.c.; and normal milk, no *B. coli* in 0·0001 c.c. These bacteriological tests are made in what must be an ideal bacteriological laboratory to work in. The *B. coli* are counted by the indol method, and as a rough guide to the total count on a milk sample the methylene blue test is used. The test tubes containing the samples are placed in a circular glass-walled thermostat, so that each one may be readily observed, and the time for the reduction of the methylene blue to the colourless leuco compound is noted. If this is less than a certain predetermined limit (13½ hours) the count is of the order of 10^6 bacteria per c.c., the limit for normal milk.

Owing to the very unsatisfactory conditions under which it is often made, a strict watch is kept on all ice-cream. Samples are taken in small Dewar flasks, so that they are still quite cold when received in the laboratory, and if found to have a high bacterial count the manufacturer cannot defend himself with the plea that it was all right when he made it and the little blighters must have multiplied exceedingly as the sample got warm on its way there.

The Sterilising Autoclave

This laboratory is very proud of its sterilising autoclave by Deutsch and Neumann. All the lid holding-down clamps are actuated from one handle, so that the bolting or unbolting of the lid is a matter of seconds only. It is gas heated, the gas supply being regulated by the pressure gauge. One very convenient feature noticed here was the provision of a thermostat at 48° C., in which agar media could be kept just molten indefinitely.

Testing Fresh Bread

It is forbidden to sell fresh bread in Holland before 10 o'clock in the morning. It is therefore necessary for this laboratory to be able to determine the actual age of a loaf. This is done by means of the apparatus designed by Straub and Hirsch (*Chemisch Weekblad*, 1935). A cylinder of standard size is cut from the crumb of a loaf by means of a toothed cutter cylinder. The compressibility of the crumb is then measured by submitting it to the action of a metal plunger loaded with a definite weight, the depth to which the plunger sinks in a definite time being noted.

A Friendly Atmosphere

One very pleasing feature of this organisation is the friendly atmosphere which pervades it. As I have mentioned elsewhere (*Food Industries Weekly*, May 22 issue), Dr. van Raalte makes a point of encouraging individuality amongst his assistants, and about each bench there was something characteristic of the person working there—for instance, some favourite photograph or picture.

No account of this visit would be complete without mention of the magnificent way in which each person explained to us in English details of what he or she was doing. I am afraid that in no similar establishment in England would a party of foreigners be addressed in their native language in such a facile way.

In conclusion the author wishes to thank Dr. van Raalte for courtesies extended to him during this visit, for permission to publish this article and to reproduce the photograph of his private laboratory, and to thank Dr. Straub for his attention to questions.

MEAT TRANSPORT on the STOCKHOLM NYNAS RAILWAYS

An open meat container of the Stockholm Nynas Railways.

A PROBLEM which raised peculiar difficulties in its solution was that which faced the Stockholm Nynas railways concerning the transport of meat from the neighbourhood of Visby to Stockholm. The meat had been transported by lorry from the plant to Visby harbour, whence it went by ship to Nynaahamn, from which latter town it was sent by rail to Stockholm and had finally to be transported by lorry from the station to the customer.

Attempts at keeping the meat cool during the transport were found to be useless, as the transport in open lorries brought on a change in temperature which was injurious to the meat. For this reason containers were built which could hold the meat without serious change in temperature.

These containers consist of a double case in wood, both the inner and the outer casing being firmly braced with angle iron. On account of the small size of the ship and the necessity of getting it into the hold, the size of the containers was kept down to 7 feet 2 inches by 5 feet 5 inches and 7 feet 2 inches high, outside dimensions. These considerations also kept the total weight, including meat, down to 3 tons maximum.

In order to avoid any possibility of conduction of heat the inner and outer shells are not in any way connected by metal pieces, wood spacing blocks being used instead. The intervening space of 4 inches between the inner and outer shells was filled with cork in the experimental container, but this was found to be too heavy, so that in the final design alfol was used instead.

To facilitate cleaning and also to ensure airtightness of the container, the inner shell of the containers is lined with sheet zinc, the plates being soldered together flat.

To permit hanging the meat inside, the container's two wood beams are arranged inside the container and provided with slots into which the iron supports are placed. This solution permits hanging carcasses of different sizes by simply moving the metal beams.

The construction of the door is interesting. In the first models it was built double, the inner door being insulated and held in place by a simple wooden outer door. In the final containers, however, this was reversed and the inner door was made of wood and the outer one insulated.

The reason for this lies in the change in the manner of cooling the container. The experimental model was cooled by the use of dry ice placed in a box at the bottom and in another at the top. It was found, however, that when the container is loaded in the open air and then cooled off by the dry ice, the changes in temperature cause damage to the meat.

For this reason it was decided to bring the container flush against the door of a cold storage room and cool it off in this way by circulation of air. The meat could then be introduced direct from the cold storage room without passing by the open air, and if the inner door was closed to prevent the escape of cold air, the outer one could be closed after the moving of the container away from the door. In this way it was discovered that the temperature of the meat and the container, which was about 35° F. at the beginning, did not rise above 45° F. after a trip of 30 hours, even when no cooling was provided for during transport. It was therefore considered possible to do away with the dry ice and so save space and weight.

ERRATUM

In our reference to the Food Group Dinner in the June issue of Food Manufacture we mentioned that Mr. B. Seebohm-Rowntree was one of the people who replied to the toast to the guests. This was not correct, as Mr. Alan Colman replied with Sir William Bragg.

PEPPERCORNS—Variations in their Weight and Density

By H. STANLEY REDGROVE, B.Sc., F.I.C., F.R.H.S.

THE VARIOUS peppercorns of commerce, both white and black, are the dried fruits of one and the same plant, *Piper nigrum* L. Black peppercorns are the dried, unripe fruits; white peppercorns consist of either the ripe fruits deprived of the outer portions of their pericarps and dried, or of black peppercorns which have been decorticated by machinery. The plant is cultivated in various parts of the East Indies, and the spice has loomed large in the eyes of the public during recent months.

Owing to climatic and other reasons, peppercorns vary much in size, colour, pungency, aroma, etc. Many varieties are distinguished for trade purposes, the values of which differ considerably. Two important characters in which the varieties differ from one another are their weight and their density.

In Blythe's well-known work on *Foods: Their Composition and Analysis* (7th edition, London, 1927) the results are given of an experiment in which sets of 100 peppercorns of the same type were weighed and are quoted below:

WEIGHT OF 100 PEPPERCORNS IN GRAMS (BLYTHE)

Penang	6·25
Malabar	6·05
Sumatra	5·15
Trang	4·57
Tellicherry	4·51

Some time ago the present writer repeated this experiment, using some of the common commercial varieties of peppercorns.

Those selected were as under:

Lampong—a Dutch East Indian pepper, small in size, greyish red-brown in colour, rather shrivelled in appearance, and having a somewhat musty odour.

Ceylon—much bolder in appearance than Lampong, greyish black in colour, and of good aroma.

Tellicherry—an esteemed Indian pepper, bold, reddish brown in colour, and very aromatic.

Mangalore kind—a very bold pepper, rich black in colour, and very aromatic. Of uncertain origin.

White Muntock—an excellent Dutch East India white pepper of the type to which the name "coriander pepper" is sometimes applied.

Variations in Weight

The first fact which emerged from the weighing experiments was that wide variations in weight were liable to occur even when the 100 peppercorns were selected at random from one and the same parcel. In one case a variation so great as 1 gm. was observed. For this reason it was thought advisable to carry out three weighings with different sets from each sample and to strike an average. Moreover, as the first decimal place in the results is liable to be affected by an error, no useful purpose is served by giving the second.

The results obtained, as published in *Spices and Condiments* (London, 1933), are quoted below.

WEIGHT OF 100 PEPPERCORNS IN GRAMS (REDGROVE)

Black Varieties

Mangalore kind	6·4
Ceylon	5·7
Tellicherry	4·8
Lampong	3·0

White Variety

White Muntock	4·7

The highest weight recorded was 6·68 gm. for a set of 100 Mangalore kind peppercorns, and the lowest was 2·60 gm. for a set of 100 Lampong peppercorns. Dividing each figure by 100, we get 66·8 mgm. and 26·0 mgm. as the average weights of single peppercorns in each of these two sets. But as each set naturally contained peppercorns of different weight, it is obvious that the weight of an individual peppercorn may diverge greatly from these limits. The big difference in weight between individual peppercorns is of interest, but it is paralleled, or rather surpassed, by the fruits of many other cultivated plants. The differences in weight exhibited by the different varieties is due to two factors, the size of the peppercorns and their density. Both these factors are of commercial interest—more so, perhaps, than is the average weight itself.

Grading

For commercial purposes, peppercorns are often graded according to density by determining the weight of a quantity sufficient to fill a standard measure—*e.g.*, an imperial gallon. Although this method is not quite accurate, since the packing will vary according to the size of the peppercorns, it has the advantage of simplicity, and is sufficiently accurate for practical purposes.

Another method by means of which a comparison may be made between the density of different peppercorns is to cast them into water—a method adopted for separating the so-called "shot pepper," consisting of peppercorns

sufficiently dense to sink, from less dense varieties. The method could be extended, if a more exact knowledge of the density was required, by using a series of liquids of different densities, this being a well-known, but somewhat cumbersome, method of determining the density of solids. If a particular peppercorn sinks in a liquid of density x, but floats in one of slightly higher density $x+d$, then the density of the peppercorn obviously lies between x and $x+d$. One difficulty which arises in connection with this method is the fact that bubbles of air tend to cling persistently to the peppercorns and thus to buoy them up. This must be carefully avoided.

It was thought that it would be of interest to make a rough comparison of the density of the peppercorns constituting the various samples used for weighing, by casting a number into water and determining the percentage that sank. Here again wide variations were noted in the behaviour of sets of peppercorns taken at random from the same parcel, and the figures given must be treated as approximate only and of use merely for purposes of comparison.

In the case of White Muntock, practically 100 per cent. sank, provided air bubbles were removed. As will be seen from the figures given below, in the case of the black varieties the order of the average densities as determined by this method is the same as the order of weights, this fact indicating the importance of density as a factor in the production of the observed variations in weight.

PERCENTAGE OF PEPPERCORNS SINKING IN WATER

White Muntock	100
Mangalore kind	90
Ceylon	80
Tellicherry	70
Lampong, very variable, about ..	60

HAM CANNING in FRANCE

THE preparation of tinned meats is one branch of the food industry which is gaining in importance in France. Certain meats, such as hams, are sold in tins in very considerable quantity, the tinning permitting a better preservation than could otherwise be obtained.

In tinning hams they are first sorted as to size and quality and then trimmed to remove the excess fat and skin. This operation permits giving them the general shape of the can to be used. After a short stay in the cold storage room the hams are salted either dry or by immersing them in brine to which a small quantity of sugar has been added.

The length of time the hams remain in the brine varies a good deal according to size, quality, and manufacture, but when the salting is completed the hams are dried slightly and placed in the smoke room. The smoke is obtained by burning sawdust of various types of wood, which may be merely ordinary wood or aromatic species. The smoked hams are then boned and fitted into the cans, which are sealed, the air pumped out, and sterilised.

Some ham is, of course, sold without being canned, this being either the whole ham with the bone or rolled ham from which the bone has been removed. There is in canned hams no standardisation of the cans, each manufacturer having his own sizes and shapes. Three sizes are, however, the most usual ones: whole ham, half hams, and quarter hams. The cans are either rectangular or shaped to the general form of the ham, which permits a lesser amount of waste.

General view of one of the plants of Olida, Paris. In the foreground the meat is being boned. At the back can be seen some hams ready for smoking. To the right is the canning and filling section where the hams are filled into the cans after boning.

PRICE FIXING

by F. S. Wilson, A.C.W.A., F.R.Econ.S.

IT IS an established fact that over a period the selling prices of a manufacturer in a capitalist state must equal the cost of production plus a fair margin of profit for the shareholders. Therefore it will be appreciated that in these days of intense industrial competition one of the main problems with which a manufacturer is confronted is that of price fixing. How then do manufacturers in the food industries fix their selling prices, and what information is essential to guide them in making their decisions? Do they obtain the maximum possible net return for their products or do they fix prices in a haphazard manner and hope for the best return?

In most food industries there is a leader or an influential firm to whom the small manufacturers in the same industry look for guidance in the fixing of prices. Many of these leaders have a sound knowledge of their costs, and, by determining the effects of production on their manufacturing costs, can safely budget their sales, production and buying programmes and so fix their selling prices at the levels which show them the maximum return, while the others often fix similar or lower prices regardless of their real costs of production which, in many cases, are totally unknown.

Factors Governing Selling Prices

Generally speaking, however, selling prices are affected by supply and demand, by competition, by cost, and sometimes by a lack of knowledge of ordinary present-day business principles. An upward tendency of prices is checked by the force of competition, although intensive advertising may help to counteract this, while a knowledge of costs by the important firms sets the limits in the opposite direction. These factors bear with equal force upon all packs and quantities of a given product and with relatively equal force upon related products. Thus a shortage of supply or an excessive demand for a certain pack of a product is nearly always coupled with a similar shortage or demand for other packs of that product and for other related products—*e.g.*, seasonal packs of canned foods. The effects of competition apply throughout all related products and all packs of a given product, and, similarly, costs at all stages indicate the level where the downward tendency of competition can no longer be met.

Effects of Economic Forces

A perturbing feature in price fixing is the widespread ignorance among many manufacturers of economic forces and their effects on costs. It is apparent to-day that prices in some of the food industries often bear no relation to cost and trade conditions. For example, quotations are frequently made that are far below or above any reasonable cost, and such quotations are the opposite of what they should be, being low on small quantities and high on large quantities, or low on one product and high on a cheaper product. Some manufacturers even quote high prices when competition is keen or demand slack and low prices when there is little competition or demand is heavy. This feature of ignorance is most disturbing to business prosperity and harmful to both manufacturers and consumers because it deprives consumers of the best grade of competitive service.

The Fallacy of Selling "at any cost."

It is obvious to-day that many manufacturers have no clear conception of what actually happens to their businesses when selling prices fall below their normal total costs. An amazing number of manufacturers argue that during a depression it is preferable to accept orders at any price if the prices cover the variable production and selling costs, as such orders help to keep the staff employed and at the very outside they are no worse off than they would have been had they not accepted the orders. On the surface this argument appears to be extremely sound in principle, but, if the full facts and its repercussions on future business are examined, a different aspect to the problem is obtained and a manufacturer must begin to wonder where such business is likely to lead him. For it is unfortunate that these manufacturers forget that if they help to depress a market they not only injure their own business but those of others in the same industry. By accepting orders which do not cover normal total costs, manufacturers must assume that such orders are only obtainable at those low prices and that the orders would not be placed at higher prices, otherwise their reasoning is incorrect even if they merely look at the question from their own particular angle. This suggests that the consumer can do without the goods and that the potential demand only comes into force at such low prices.

In a severe depression the egoistic instinct amongst manufacturers reaches its maximum level and they become filled with the idea that they must stop their competitors obtaining business at all costs, and to make this effective they offer special inducements in the shape of price reductions. It is nothing short of panic—just a race to bankruptcy or the survival of those with the strongest financial resources.

Some manufacturers in the food industries have seen the folly of this cut-throat price competition and by means of trade associations and price agreements have tried to eliminate wasteful competition. But the rulings of trade associations are merely gentlemen's agreements and not enforceable by law. They are liable to be broken at any

time by any member and are not always effective over a period of years.

Dumping of Foreign Goods

In this country, as in other highly developed industrial countries, the dumping of goods by foreign countries has created problems which have had to be faced by manufacturers and in order to meet this uneconomic competition whole industries have had to sell at prices below their normal total costs until they have been able to prove to the Imports Duties Advisory Board that unless a duty is placed upon the foreign goods they as an industry cannot compete at economic levels. The results have so often been the imposition of import duties and/or the fixing of quotas.

The dumping of goods abroad may be the result of employing cheap labour, or it may be the result of large manufacturers, who realise that they cannot reap the benefits to be derived from increasing returns in large-scale production, because such production would tend to decrease prices owing to increasing supplies being available. Therefore they increase their output and the surplus available after providing for their Home Market budget is dumped abroad at prices which cover their variable costs and which make some contribution towards their fixed expenses.

A Price-conscious Public

In some of our leading food industries the manufacturers have set out to make the public price conscious by continual price reductions. Thus in these and similar cases the costs must be determined so that they do not exceed the predetermined selling prices. In order to make this effective the costs controllable by the management and the requisite profit are subtracted from the predetermined selling prices and the balance, which is available for the purchase of ingredients and wrapping materials, is obtained. The Buying department are then given limits above which they must not buy. Of course this is only possible if the manufacturer enjoys a large and ready sale for his products and is enabled to bargain with the suppliers of essential raw materials.

It will be appreciated, therefore, that food manufacturers are faced with a problem of vital importance when fixing their selling prices, for in effect they are fixing their own incomes. No hard and fast formula can be laid down in the matter of price fixing, as the whole of the facts and conditions ruling at the time must be taken into full consideration. One fundamental point must however be remembered—that is, that the price which the consumer is willing to pay for an article is determined by the utility or desirability of the article to him, the price being the only determinable measure of a consumer's desire for anything.

ANNUAL MEETING of SOCIETY of CHEMICAL INDUSTRY

THE fifty-fifth Annual Meeting of the Society of Chemical Industry is to take place in Liverpool from July 6 to 10. A notable feature of this year's conference is the attendance at the meeting of a large party of American chemists who are members of the American Institute of Chemical Engineers and are visiting this country as guests of the Institution of Chemical Engineers. The headquarters of the Society during the meeting will be at the Adelphi Hotel.

The programme of events includes the following items of interest to food chemists:

MONDAY, JULY 6.—8 *p.m.:* Reception by the Vice-Chancellor of Liverpool University, Sir Hector J. W. Hetherington, M.A., LL.D., in the Gilmour Hall, the University. Dancing. Evening dress, Orders and Decorations.

TUESDAY, JULY 7.—10 *a.m.:* Meeting of Council of the Society in the Senate Room, the University. 10.45 *a.m.:* Annual General Meeting, in the Physics Theatre, the University. Procedure: Welcome by the Lord Mayor of Liverpool, Councillor R. J. Hall. Business of the Annual General Meeting. Address by the President, W. A. S. Calder, Esq., F.I.C., M.I.Chem.E., "The Chemist as World Citizen". 1 *p.m.:* Luncheon, by invitation of the Chairman, Committee, and Members of the Liverpool Section, in the Ballroom, the Adelphi Hotel. 2.30 *p.m.:* Leave Adelphi Hotel by motor-coach for visit of inspection of the *Franconia*. Tea on board, by invitation of the Directors of Cunard White Star, Ltd. Cost of travelling, 2s. each. 8.30 *p.m.:* Reception and Dance in the Town Hall, by invitation of the Lord Mayor of Liverpool, Councillor R. J. Hall. Evening dress, Orders and Decorations.

WEDNESDAY, JULY 8.—10 *a.m.:* Ladies leave Adelphi Hotel by motor-coach for visit to the Aintree Biscuit Factory of Messrs. W. and R. Jacob and Co., Ltd. Cost of travelling, 2s. each. 11.30 *a.m.:* Presentation of the Society's Messel Medal to Sir Robert Mond, followed by the Messel Memorial Lecture by the Medallist, "Works as I have Seen Them Grow". In the Ballroom, the Adelphi Hotel. 2.15 *p.m.:* Leave Adelphi Hotel by motor-coach for the following Works Visits: Bowater's Mersey Paper Mills, Ltd., Ellesmere Port. Inspection of modern Newsprint Mill with an output of 130,000 tons per annum. Tea will be provided by invitation of the Directors.—Lever Brothers' Factory, Port Sunlight. Tea will be provided by invitation of the Directors.—The Stork Margarine Factory, Bromborough. Tea will be provided by invitation of the Directors.—Tate and Lyle, Ltd., Vauxhall Road Sugar Refinery, Liverpool. Party limited to thirty gentlemen only. 7 *for* 7.30 *p.m.:* Annual Dinner of the Society in the Ballroom, the Adelphi Hotel. Dancing 10 p.m. to 1 a.m. Evening dress, Orders and Decorations. Tickets, 12s. 6d. each.

THURSDAY, JULY 9.—10 *a.m.:* Food Group Congress with the Royal Sanitary Institute, in the Art Gallery, Municipal Buildings, Southport. Presidential Address by Dr. L. H. Lampitt, D.Sc., M.I.Chem.E., F.I.C. Discussion on "Food Package and the Consumer". (Members to make their own travelling arrangements.) 1 *p.m.:* Luncheon, by invitation of I.C.I. (General Chemicals), Ltd., in the Ballroom, the Adelphi Hotel. Attendance is limited to Members of the Society, American, Canadian and other distinguished guests. 1 *p.m.:* Luncheon for Ladies, by invitation of the Chairman, Committee and Members of the Liverpool Section, in the Adelphi Hotel. 7 *p.m.:* Leave Adelphi Hotel by motor-coach for Port Sunlight. Cost of travelling, 2s. each. 7.30 *p.m. for* 8 *p.m.:* Dinner, by invitation of the Governor, Chairman and Directors of Lever Bros., Ltd., in the Hulme Hall, Port Sunlight, followed by Dancing in the Lady Lever Art Gallery. Evening dress.

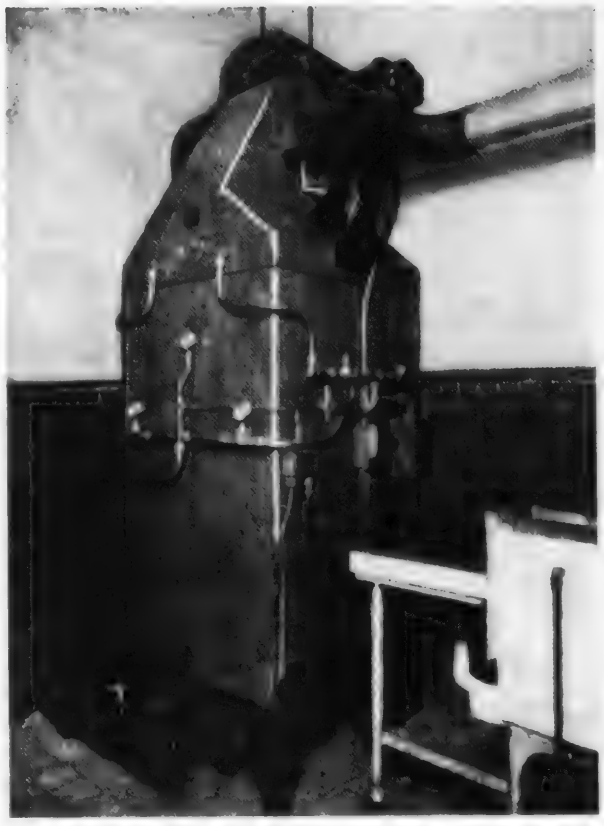
FRIDAY, JULY 10.—9.30 *a.m.:* Leave Adelphi Hotel by motor-coaches for visit to the Dolgarrog Works of the Aluminium Corporation, Ltd., and the Dolgarrog Power Station of the North Wales Power Co., Ltd.

SILICA GEL APPLICATIONS

THE applications of silica gel in dehydration, air conditioning, refrigeration, and similar commercial processes are described in an attractive booklet issued by Silica Gel, Ltd., of London. Practically anhydrous and purified gases can be obtained by the use of both high and low pressure type Silica Gel equipments. In recent years the carbon dioxide industry has expanded tremendously owing to the wide use of the gas in solid form and to the high consumption of soft drinks, of which it is an essential ingredient. This gas can be effectively and economically dried and purified by silica gel.

Silica gel air conditioning units, which control the temperature and the moisture content of the atmosphere, have been designed for both industrial and domestic purposes. These units are simple and direct in operation, can be automatically controlled to meet the conditions of temperature and humidity required, and, it is claimed, have an operating cost considerably lower than is possible by other means.

Iceless refrigerators, in which a gas such as ammonia or sulphur dioxide is used as refrigerant and fitted with silica gel adsorbers, have been employed for the refrigeration of buildings and for the preservation of foodstuffs in transit.



A Single Silica Gel Refrigerator Unit serving six large refrigerators.

BARTON'S SUGAR-FREE MILK

THE restrictions necessarily placed upon the diet of diabetics, and the consequent difficulty and monotony of feeding, are now substantially removed by the possibility of obtaining, quite inexpensively, a sugar-free milk. This must not be confused with unsweetened condensed milk, which still contains much natural sugar and is, therefore, forbidden to diabetics. Sugar-free milk is, in effect, pure whole milk from which the milk sugar (lactose) has been removed but possessing otherwise all the food value and nourishment of the original milk. The value of such milk is obvious. Whilst being in itself a nourishing food, in permitting the preparation of many hitherto prohibited dishes it brings welcome variety to the diet, and Barton Laboratories have prepared a booklet of new and interesting recipes especially prepared for the diabetic. Another point of interest is that it is sold at a very reasonable price, costing little more than ordinary milk, a tin holding the equivalent of one quart of milk being retailed at one shilling. It is concentrated and should be diluted with 1½ pints of water for ordinary use, when it approximates the composition of ordinary milk, only the milk sugar being absent.

Analysis.—The following is the analysis of Barton's Sugar-Free Milk when diluted one and a half times as directed, and a comparison with normal milk of average good quality:

	Barton's Sugar Free. Per Cent.	*Normal Milk. Per Cent.*
Fat	3·79	3·68
Proteins	3·48	3·42
Ash	0·19	0·73
Lactose (milk sugar) ..	0·09	4·78

NEW TEST for TIN

Two technical publications just issued by the International Tin Research and Development Council deal with new reagents for the detection of tin. Series A, No. 40, a reprint of a paper read before the Society of Public Analysts by Robert E. D. Clark, M.A., Ph.D., gives the methods of using the reagents, and Series A, No. 41, the methods by which they may be prepared.

The reagents are 4-chloro- and 4-methyl-1:2 dimercaptobenzenes. The formation of a red compound with either of these reagents constitutes a specific and very delicate test for tin. When a few drops of a 0·2 per cent. solution of these mercaptans in aqueous sodium hydroxide solution are added to solutions of less than 15 per cent. of hydrochloric acid containing not less than one part in a million of tin, and the mixture is warmed, a pink or red colour develops in a few seconds. Stannic tin is less sensitive, so reduction with thioglycollic acid beforehand is advised. With the methyl derivative the colour is developed more rapidly than with the chloro derivative. These reagents can be used for the colorimetric determination of tin with good results. The second technical publication gives laboratory details for the preparation of these specific reagents for tin by the most economical methods.

Copies of the above publications may be obtained free of charge from the International Tin Research and Development Council, Manfield House, 378, Strand, London, W.C. 2.

INFORMATION and ADVICE

Smoked Cod Roes—Cold Processing of Fruit Pulp—Nougat—Calf's-Foot Jelly—Prevention of Mould Growth—High Boiled Sugar Goods—Sealing of Tins (June Issue)

Smoked Cod Roes

2,018. *Can you please tell me how cod roe is prepared for smoking?* (Alaska.)

We have been informed that the best roes to use for this purpose are firm ones. Ovaries filled with ripe eggs immediately before spawning give a cure which is too soft and too dark in colour.

The roes are pickled in brine (70° strength). The time of brining varies with the size of the roe and the taste of the special market. It has been found that for a roe weighing 2 lb. 60 minutes' immersion gives a palatable result.

The roes are laid over narrow racks so that the two lobes hang over the sides to allow of good drying between the lobes. They are allowed to "drip" thus for 30 minutes or longer at ordinary temperatures.

In smoking do not "case harden" or cook the roes by giving too much heat at the beginning. In smoke at a temperature of 80° F. and a relative humidity of about 50 per cent., the 2 lb. roes cure satisfactorily in 12 to 14 hours. When cured the roes should slice nicely like ham or smoked salmon.

Smoking with oak chips and sawdust gives a good flavour. The addition of chips of juniper improves the flavour.

Cold Processing of Fruit Pulp

2,019. *I am interested in the barrelling and preserving of strawberry and raspberry pulp. Would you please be good enough to let me know whether the fruit should be washed, and if so how, and also the best type of cask to use; and whether they should be paraffined.* (London.)

We have been advised that it is better to use waxed casks, but there is, we understand, quite a large proportion of fruit pulp packed in unwaxed casks both in this country and on the Continent.

Empty acetic acid casks (40 gal.) are very frequently used by pulp packers, as these are sterilised and already waxed. If a supply of these is not available, either beech or oak casks may be used, but they should be thoroughly washed and sterilised before use in order to remove all yeasts which may be present. It is not usual to wax such casks, but for colour fruit it may be desirable.

The method is to take a clean barrel and place it with the bung hole over a jet of dry steam. After steaming for 15 minutes or so the cask is removed and about 2 lb. of melted paraffin wax is poured in. The bung is replaced and the cask rolled and shaken well. This distributes the wax over the surface, which, being hot, spreads evenly. Particular care should be taken to use dry steam and to put the paraffin wax in a few minutes after removing the steam jet whilst the cask is still hot.

We understand that most pulp packers do wash the fruit prior to pulping, and this is usually done by putting the fruit into tanks or casks of clean, cold water containing about 100 parts per million of SO_2, then removing by a woven wire sieve and draining. The washed fruit is then put into a 40-gal. cask in which ½ gal. of 6 per cent. sulphurous acid and 2 gal. of water have been previously put. When 300 lb. of fruit have been added, a further ½ gal. of 6 per cent. sulphurous acid is added, and the cask filled up with water. After well sousing it is headed up in the usual way.

Nougat

2,020. *Is it possible that you have a recipe for the manufacture of nougat in which starch is used in conjunction with same, as we understand that some nougat does contain thin-boiling starch, or some other form of cornflour or tapioca starch?* (London.)

Starch, we understand, is claimed to give body, weight and smoothness to the finished product, but for successful incorporation experimental boilings must be made to obtain the particular texture required.

In using thin-boiling starch for making nougat, the idea is to beat up a starch jelly boiling with a colloid such as gelatin, and we would suggest you experiment along the following lines:

Take 40 lb. sugar and 40 lb. glucose and bring to the boil. Then add slowly 3 lb. thin boiling-starch suspended in 1 gal. of water. Boil to about 250° F., and pour on to a solution of 2 lb. of gelatin in 2 gal. of water. Beat up to stiffness.

Cornflour will give additional body, and it may be possible to reduce a little of the gelatin when this is incorporated.

As mentioned previously, however, such preparations are truly a matter for experimentation.

Calf's-Foot Jelly

2,021. *Will you please supply formula for the manufacture of calf's-foot jelly—orange, lemon, and wine flavours?* (Ireland.)

The calves' feet are thoroughly washed and put into a pot and covered with water. Boil for a short time and pour off the water, removing the scum, etc. Cover the feet again with boiling water, and allow to boil for ten to

twelve hours, or until the stock sets firm when cool. If the stock is not firm enough, a little gelatin may be added to strengthen it, and the jelly must be firm enough to allow of the addition of the other ingredients, such as wines, etc., without diminution of its setting properties.

After the stock is ready, it should be passed through a hair sieve and poured into a mould, in which it solidifies. Wash the oil off the top of the firm stock with warm water, then gradually run it down to liquid again to receive the other ingredients which make up the clear and coloured jelly.

To each 4 quarts of the liquid stock add the rind of 4 and the juice of 8 lemons, 1½ lb. of loaf sugar, and 8 whites of eggs and their shells. Allow them to boil slowly for a little while, and then simmer for about ten minutes.

A jelly bag should now be ready and should be hung in a jelly cupboard or near to the heat of the oven or fire, so that the jelly will not solidify while being poured through.

Pour the stock into the bag and re-strain until a clear liquid jelly results. Now add the colouring and flavouring and jar off.

For use in this formula it has been suggested that soluble oils of lemon and orange should be used at the rate of 1 oz. to 100 lb. of jelly. For a wine flavour, natural wine flavour in the proportion of ½ pint to about 10 lb. of jelly could be used.

The following is another formula to produce about 15 gal. of jelly:

Sugar	27 lb.
Glucose	13½ lb.
Gelatin	7¾ lb.
Citric acid	12-16 oz.
Colour and flavour to suit.	
Water sufficient to produce 15 gal.	

The gelatin will require to be submitted to preliminary soaking for about four hours before required. First of all it should be immersed for one hour until it has absorbed an equal weight of water, the surplus water then being drained away, and the mash should remain for a further three hours, when it will be capable of being dissolved with the sugar and gelatin.

Suitable recommendations were made regarding supplies of essences for flavouring.

Prevention of Mould Growth

2,022. *We would be glad if you would tell us the best antiseptic for the treatment of cardboard tops to prevent mould growth.* (Yorkshire.)

Glycerin, we understand, is the best product for this purpose. The tops should be dipped in the glycerin and allowed to drain on wire sieves.

High Boiled Sugar Goods

2,023. *In the "Food Industries Manual" I found on page 97 a table comparing the variable boiling point of water with the different barometric pressure. Besides the change of barometric pressure there are two more factors influencing the final consistency of high boiled sugar goods—viz., the moisture of the air and the prevailing outer temperature.*

I should be very much obliged if you could inform me whether there are similar tables dealing with those two factors to the one given in the Manual. Even if there are no fixed rules I should be glad to learn how best to obviate the above-mentioned influences. (London.)

The table given on page 97 in the Confectionery Section of *Food Industries Manual* deals with the variation of the boiling point with changes in barometric pressure. This only has an influence on the boiling of high boiled sugar as far as registration of the true temperature during boiling is concerned.

The other factors mentioned by the enquirer which influence the final consistency of high boiled goods—namely, moisture of the air and prevailing outer temperature—are factors which influence the goods after boiling and not during the process of boiling.

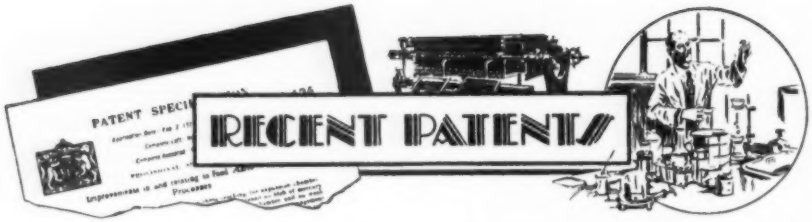
High boiled sugar goods are hygroscopic—that is, they have a tendency to take up or absorb moisture from the air—and this absorption of moisture causes granulation and stickiness. Therefore, immediately high boiled goods have been made they must not be exposed to air having a high humidity (moisture content). It is advisable that the goods are removed immediately from the vicinity of the boiling pan, either to the extreme end of the department or to another department, because the presence of boiling pans in a department has a tendency of increasing the relative humidity of the air, and the air therefore becomes laden with moisture, which is detrimental to the finished high boiled goods.

The drier the air, the better for the goods, and if air at a relative humidity of 50 per cent. to 55 per cent. can be obtained no fear need be experienced that the high boiled goods will absorb moisture. Air conditioning is, of course, the one sure way of guaranteeing dryness of air.

Regarding the prevailing outside temperature, this only has a bearing on the goods when the difference between the outside temperature and the temperature of the goods is such as is liable to cause condensation. High boiled goods should always be kept slightly warmer than the air to which they are exposed, and should be packed in this warm state. By this means the humid air coming in contact with the warm goods is raised in temperature, and this raising of temperature reduces the relative humidity of the air immediately surrounding the goods. In other words, the air is capable of carrying more moisture at the higher temperature and therefore will have an inclination of picking up moisture from the goods rather than depositing it, as might be the case if the goods were of a lower temperature than the air, and the air was already near saturation point.

Enquiry 2,016—Sealing of Tins (June Issue)

Our attention has been drawn by Ashworth and Parker, Ltd., to the fact that they tried the effect of vacuum sealing some time ago on one of their double seaming machines. The result in the preservation of crispness and aroma, they state, was remarkable, as the biscuits were still exactly as fresh from baking.



These particulars of New Patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The "Official Journal of Patents" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Latest Patent Applications

12880. BLAND, H. BARKER: Containers for cream, etc. May 7.
13122. BURDIN, N. V.: Machines for punching-out pieces of confections. May 8.
13323. INDUSTRIAL PATENTS CORPORATION: Treatment of egg whites, etc. May 11.
13345. BOAKE, ROBERTS AND CO., LTD., A., AND REVIE, G. N.: Manufacture of cereal substances for preparation of beverages. May 11.
13457. BARTON LABORATORIES: Production of food preparations. May 12.
13790. HUGEL, E. J.: Purification of juices, etc. May 15.
13850. NAAMLOOZE VENNOOTSCHAP PHILIPS' GLOEILAMPENFABRIEKEN: Production of foodstuffs, etc., possessing antirachitic properties. May 15.
14125. YEATMAN, W. T.: Device for cooking hams. May 19.
14269. JESSOP, J. A.: Production of lactic sugar. May 20.
14453. FAIRCLOUGH, W.: Process for treating milk, etc. May 22.
14577. NATURIN GES.: Production of skins for sausages, etc. May 22. (Germany, May 23, 1935.)
14784. LUNDSGAARD, H. C.: Preparation of edible emulsions. May 25.
14849. THOMSON, G. S.: Milk-testing apparatus. May 26.
14895. SOC. ANON. DES BREVETS FAUTH: Production of blood meal from whale blood. May 26. (Germany, May 28, 1935.)
14928. THOMPSON, J. S.: Composition for improving brown bread. May 27.
15152. JONSSON, G.: Manufacture of fish-liver meal. May 29.
15268. INTERNATIONAL YEAST CO., LTD., OLSEN, A. J. C., AND WATSON, E. G.: Manufacture of yeast. May 29.
15305. GOULD, G. R., AND SPALDING, C. G.: Production of pectin composition. June 2.
15406. VERHAEGHE, A.: Manufacture of soup concentrate. June 2. (Belgium, June 1, 1935.)

Complete Specifications Accepted

446,323. OSWEGO FALLS CORPORATION: Collapsible paper-containers, particularly for products such as ice-cream in bulk.
446,529. HALL LABORATORIES, INC.: Treatment of milk and milk preparations.
446,554. VOGT PROCESSES, INC.: Refrigerating apparatus particularly for hardening bars of ice-cream or other comestibles.
446,726. STEEL BROS. AND CO., LTD., and GIBSON, S. H.: Treatment of rice.
446,792. INDUSTRIAL PATENTS CORPORATION: Method of stabilising shortening, and the improved shortening resulting thereform. (Addition to 395,971.)
446,826. HUTCHESON, W. W., AND MASON, W. C.: Evaporators, such as for the concentration of milk.
446,839. WEBB, R. H.: Apparatus for moulding table jelly and other plastic substances. (August 19, 1935.)
446,997. GES. ZUR VERWERTUNG FAUTH'SCHER PATENTE: Process for the manufacture of edible oils and edible fats. (April 10, 1934.)
447,105. MASON, W. C., AND HUTCHESON, W. W.: Process for evaporation of whey and its production in powder form.
447,168. HARPER, G.: Attachment to sausage machine for filling purposes.
447,201. STEEL BROS. AND CO., LTD., AND GIBBON, S. H.: Treatment of rice grains.
447,203. NUTT, H. Y.: Closure for bottles, barrels, jars, tins, boxes, and the like.
447,609. PARKER-MEYER-DENNIS CO.: Machines for making confections and applying handles thereto. (October 16, 1933.)

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

Abstracts of Recent Specifications

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume, or in bound volumes price 2s. each.

442,892. **Food preparations; ice-cream preparations.** KRAFT-PHENIX CHEESE CORPORATION, 400, Rush Street, Chicago, U.S.A.
Concentrated casein is obtained by treating skimmed milk having a *p*H approximately between 6 and 7 with casein-precipitating enzymes prepared from *Aspergillus Onyzæ* which has been propagated on a high-protein culture medium, the supernatant liquid being removed after the casein has been precipitated. The enzymes may be obtained by extracting with distilled water at about 37° C. *Aspergillus Onyzæ* propagated, for example, on wheat bran. The extract may be added to raw or pasteurised milk of *p*H between 6 and 7 and allowed to stand at about 37° C. for about 30 mins. The product may be heated to pasteurisation temperature—*e.g.*, about 63° C.—to destroy the enzymes and is drained or filtered to give a sludge which can be used as such or is dried—*e.g.*, by spraying or on rollers—at a low temperature—*e.g.*, 74° C. The product can be redispersed in water and may be used as a stabiliser, for example in an ice-cream mix where it may be substituted for a substantial proportion of the milk solids, including fat, as well as for part or all of the usual stabiliser.

443,528. **Stable yoghourt preparations.** MILCH-INDUSTRIE AKT.-GES., Prague-Smichov, Czecho-Slovakia.
Formation of mould-fungi is prevented without detriment to the activity of *B. Bulgaricus* by applying to the surface of yoghourt in the container an edible layer with a high syrup content such as jam or honey. In the case of yoghourt with an 8 per cent. fat content and 2 to 3 per cent. sugar content, for example, the protective layer specified consists of a jam containing 50 per cent. sugar and 20 per cent. water. The layer is consumed with the yoghourt, and this disguises the taste, which is repugnant to some individuals. Example: Milk sugar is added to pasteurised whole milk and the fat content raised to 8 per cent. before filling in 165-gm. portions into one-fifth-litre wide-necked glasses. The usual treatment to yield yoghourt is then applied at 35° to 37° C., and, after standing to stiffen, the contents are covered with a layer of 30 to 35 gm. strawberry jam. (Convention date, Hungary, March 9, 1935.)

443,705. **Acid calcium lactates as aerating ingredients.** ROYAL BAKING POWDER CO., 595, Medicine Avenue, New York, U.S.A.
Crystalline compounds containing 3 or 4 lactic acid groups per atom of calcium and no water of crystallisation are obtained from the amorphous compound prepared by evaporating a mixture of neutral calcium lactate and lactic acid in the required molecular proportions. This mixture is dissolved in warm ethyl alcohol containing still more lactic acid (in the proportion of 5·15 per cent. of the weight of alcohol), when crystals of the new lactate are deposited and are washed with ethyl alcohol until free from mother liquor. Absence of water is essential to the success of the method, since the neutral calcium lactate will separate in the presence of any considerable amount of water. (Convention date, U.S.A., May 23, 1933.)

443,911. **Mould growth prevention in jams.** CALIFORNIA FRUIT GROWERS' EXCHANGE, 607, South Hill Street, Los Angeles, California.
Mould growth and weeping in jams, jellies, and other food products are claimed to be prevented by enclosing the products in bags made of paper or other cellulosic material united with one or more layers of pectin admixed with a preserving agent or a germ or mould-destroying agent. The pectin is preferably applied in solution form, the follow-

ing being an example of the procedure followed in preparing such solutions: 177 gm. of 160 grade pectin (or the equivalent amount of another grade) are mixed with 1,300 gm. sugar, and the mixture suspended in 3,000 c.c. water. After complete dispersion (which is hastened by occasional stirring), addition is made of 188 gm. sodium benzoate (or the equivalent quantity of another recognised preservative). This dispersion should preferably be applied to the cellulosic sheet material within a few days after preparation in order to impart maximum gas tightness. Foodstuffs should be packed in the material so that they come into direct contact with the layer of pectic substance. (Convention date, Germany, September 7, 1933.)

445,002. **Opening up cocoa beans.** Dr. A. Diefenbach, Auf der Höhe, 3, Arlesheim, Switzerland.

Comminuted cocoa beans are opened up, according to the process described, by prolonged immersion in sugar solution till swollen, followed by drying and roasting in the usual manner. Any common type of sugar may be applied including fructose, grape sugar, and caramel, the action of which is ascribed to formation of chemical or addition compounds between the sugar and the bean constituents such as cellulose, hemi-cellulose, proteins, and alkaloids. There also comes into play a physical effect in that the cells and tissue elements of the beans are disrupted by the sugar as it separates from the solution, in consequence of which, both de-oiling (following roasting) and fine-milling are facilitated. The product readily swells in solution and is less prone to settle. In an example, 100 kilos broken-up cocoa beans, from which husks and shoots have been removed, are well moistened with 30 litres of 50 per cent. sugar solution, dried in a roasting drum, and lightly roasted. (Convention Date, Switzerland, July 21, 1934.)

445,768. **Hydrogen peroxide in cake-making.** E. I. Du Pont de Nemours and Co., Inc., 350, Empire State Building, 5th Avenue, New York, U.S.A.

Hydrogen peroxide in aqueous solution is proposed as a substitute for ordinary baking powders in the case of cake mixtures and the like containing both sugar and fat. Instead of transferring directly to the oven, the mixture containing hydrogen peroxide gives best results after standing at ordinary temperature until desired rising has taken place before placing in oven. Duration of the rising process is found to be dependent upon the *p*H of the mixture to which the hydrogen peroxide is added, it being shorter at *p*H of 7 than at anywhere between the range of 2 to 6. To bring up the *p*H of the mixture to the higher figure, where necessary, it is consequently proposed to add an acid-combining agent such as borax, trisodium phosphate, or sodium bicarbonate. In general, bakery products obtained by applying the technique described are lighter in colour (owing presumably to the bleaching action of hydrogen peroxide) and possess a better grain. (Convention Date, U.S.A., September 9, 1933.)

LATEST TRADE MARKS

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal", and is published by permission of the Controller of H.M. Stationery Office. The "Trade Marks Journal" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

AYLI.—568,349. **Substances used as food or as ingredients in food.** Jarman and Flint, Ltd., Tower Buildings, Carr Lane, Hull. May 27.

DANAZOLA.—566,483. **Milk products for food.** Rasmus Hansen, 20, Ny Kongensgade, Copenhagen, V. Denmark. May 27. (Associated.)

Registration Nos. 425,298 (2334) and 425,673 (2322) will be cancelled if and before the Applicant's Mark is registered.

FRISK.—568,448. **Edible oils and edible fats.** De Bruyn, Ltd., Unilever House, Blackfriars, London, E.C. 4. June 3.

Registration No. 446,115 (2410) will be cancelled if and before the Applicants' Mark is registered.

GARDEN OF EDEN.—567,897. **Table jellies.** Benjamin Bard and Abraham Bard, trading as Bard Bros., 512a, Romford Road, London, E. 7. May 20.

HAPPIDAY.—567,362. **Edible decorations for cakes.** Batger and Co., Ltd., 102, Brook Street, Ratcliff, London, E. 1. May 27. (Associated.)

HEARTVANOL.—567,338. **Essences (not alcoholic), essential oils (not alcoholic), colourings, flavourings (not alcoholic), brewing sugars, caramels, finings, preservatives, frothing preparations, and soda bicarbonate, all for use as ingredients in food.** William Duckworth, trading as William Duckworth and Co., Old Trafford Essence Distillery, Chester Road, Manchester. May 20. (Associated.)

LYCEUM.—567,212. **Cooking fats, lard (for food), chicken and ham roll, hams, sausages, meat and fish pastes, potted and canned meats, vegetables (for food), canned fruits and fish.** A. J. Mills and Co., Ltd., Colonial House, Tooley Street, London, S.E. 1. May 27.

LYRIC.—567,213. **Cooking fats, lard (for food), chicken and ham roll, hams, sausages, meat and fish pastes, potted and canned meat, vegetables (for food), canned fruits and fish.** A. J. Mills and Co., Ltd., Colonial House, Tooley Street, London, S.E. 1. May 27.

MAID OF CARDIGAN.—567,672. **Butter, cheese, cream, milk, condensed milk, powdered milk (for food), and preparations of milk or cream (for food).** Cow and Gate, Ltd., Cow and Gate House, Stoke Road, Guildford, Surrey. May 27.

The Applicants undertake to use the Mark only on goods produced in Cardigan.

MAID OF CARMARTHEN.—567,671. **Butter, cheese, cream, milk, condensed milk, powdered milk (for food), and preparations of milk or cream (for food).** Cow and Gate, Ltd., Cow and Gate House, Stoke Road, Guildford, Surrey. May 27.

The Applicants undertake to use the Mark only on goods produced in Carmarthen.

MAID O' CHESHIRE.—568,348. **Butter prepared from milk produced in Cheshire.** Dobsons Dairies, Ltd., Lloyd Road, Levenshulme, Manchester. May 27.

MAID OF DUNRAVEN.—567,673. **Butter, cheese, cream, milk, condensed milk, powdered milk (for food), and preparations of milk or cream (for food).** Cow and Gate, Ltd., Cow and Gate House, Stoke Road, Guildford, Surrey. May 27.

MALLIPAN.—568,260. **Substances used as food or as ingredients in food.** Jean Krier, trading as Maison Kunz, 74, The Promenade, Cheltenham, Gloucestershire. May 20.

MEADOWCREEK.—568,292. **Butter.** Dominion Dairy Co., Ltd., Bicester Road, Aylesbury, Buckinghamshire. June 3.

Registration of this Trade Mark shall give no right to the exclusive use of a device of a pastoral scene.

MISSION.—566,694. **Canned, dried, and bottled fruits, vegetables, fish, and corn; pickles, sauces, relishes, and mustard, for food.** California Packing Corporation, 101, California Street, San Francisco, State of California, United States of America. May 20. (Associated.)

POWELL'S PRODUCTS.—567,220. **Preserves (for food), jams, lemon curd, mincemeat, puddings, sauces, pickles, vinegar, jellies (for food), custard powder, table creams, blancmange powder, and cake mixtures.** Powell's Products, Ltd., Kells Lane, Low Fell, Gateshead-on-Tyne. May 20. (Associated.)

Registration of this Trade Mark shall give no right to the exclusive use of the words "Powell's Products".

PREPUF.—566,254. **A food preparation for making pastry.** Blackey's Food Co., Ltd., Hungate, Lincoln. May 20.

SANSHAY.—566,691. **Rice, tapioca, peas, beans, oatmeal, and barley, all for human consumption.** George Harker and Co., Ltd., 64, Park Street, Southwark, London, S.E. 1. May 27.

TIDDLEY WINKS.—568,400. **Substances used as food or as ingredients in food.** Huntley and Palmers, Ltd., King's Road, Reading; and 162, Fenchurch Street, London, E.C. 3. May 27.

NEW COMPANIES

Agelvas, Limited. River Works, Putney Embankment, S.W. 15. To carry on the bus. of mnfrs. of and dlrs. in chocolates, confectionery, etc. Nom. Cap.: £10,000. Permt. dirs.: A. A. Guerra, 42, Sheen Park, Richmond, Surrey, and O. P. Hill, Ker Sainte Anne, Church End, Hendon.

Asparagus Estates, Limited. To plant, grow, and sell asparagus, etc. Nom. Cap.: £25,000 in £1 shares. Permt. dir.: F. E. Crawley, 132, Chiltern Court, N.W. 1. Sub.: Dr. H. J. Macbride, 46, Putney Hill, S.W. 15

Bedford, Amery and Company, Limited. To carry on the bus. of mnfrs. of and dlrs. in food products, etc. Nom. Cap.: £100 in £1 shares. Dirs.: Not named. Remun. of dirs.: As voted by the company. Subs.: J. B. Crouch, 116, Chancery Lane, W.C. 2; P. O. Ansell, 54, High View Gardens, Potters Bar, Middlesex.

Burnard, H., Limited. 251 to 253, Pentonville Road, King's Cross, N. 1. To carry on the bus. of engineers and mnfrs. of apparatus, furniture, etc., used in dairies, breweries, or other places dealing with liquids. Nom. Cap.: £1,000 in £1 shares. Dirs.: W. P. Freeth, 58b, Upper Richmond Road, Putney, S.W. 15; H. Burnard, 49, Meadow Close, Raynes Park, S.W. 20. Qual. of dirs.: 100 shares.

Candar Coffee Company, Limited. To carry on the bus. of importers of and dlrs. in coffee, etc. Nom. Cap.: £500 in £1 shares. Dirs.: F. Fogwill, 6, Auckland Road East, Southsea; R. S. Ernst, 140b, Victoria Street, Bristol; L. C. Snell, 188, Old Christchurch Road, Bournemouth. Qual. of dirs.: Ten shares. Remun. of dirs.: As voted by the company.

Cheepops, Limited. To manufacture the confection known as "Cheese-Popcorn", etc. Nom. Cap.: £100 in £1 shares. Dirs.: To be appointed by the subs.: Qual. of dirs.: None required. Subs.: C. Surtees, 18, Austin Friars, E.C. (solr.); C. H. Scott, 18, Austin Friars, E.C.

Cornish Cream Ice Company, Limited. To carry on the bus. of mnfrs. of and dlrs. in ice-cream, etc. Nom. Cap.: £2,000 in £1 shares. Dirs.: F. G. Newton, Camelford House, Camelford, Cornwall; R. C. Soans, Bridwell Lane, Kettering; W. D. Graham, Barton Hall Hotel, Kettering. Qual. of dirs.: £250 shares.

Fox, F. E., and Son, Limited. Victoria Biscuit Works, Batley. To take over the bus. of biscuit, brandysnap, and gingerbread manufacturers cd. on at Batley as "F. E. Fox and Son". Nom. Cap.: £20,000. Permt. dirs.: F. E. Fox, The Hawthorns, Upper Batley, Batley (ch.), and M. S. Fox, 7, Suffolk Avenue, Carlton Grange, Batley.

Harley, William, Limited. To take over the bus. of a licensed victualler, wine and spirit mcht. cd. on at Pepper Street, Nottingham, as "William Harley". Nom. Cap.: £8,000 in £1 shares (4,000 ord. and 4,000 pref.). Dirs.: J. Harley Smith, 9, Bridgford Road, W. Bridgford, Notts (permt.); A. W. Smith, The Netherlands, Trent Side, W. Bridgford; R. Harley Smith, address not stated. Qual. of dirs.: £100 shares.

Hartley, Wm. P., Limited. To acquire the whole or part of the undertaking of Wm. P. Hartley (London and Aintree), Ltd. (in liquidation), and to carry on the bus. of growers, producers, and mnfrs. of fruit, preserves, jams, etc. Nom. Cap.: £100 in 5s. shares. Dirs.: Not named. Subs.: Christiana Hartley, J.P., 4, Lord Street West, Southport; W. Hartley Higham, Wayside, Westcliffe Road, Birkdale.

Hotton, William H., and Company, Limited. To take over the bus. of mnfrs. of aluminium and stainless steel goods cd. on at Priory Road, Aston, Birmingham, as William H. Hotton and Co. Nom. Cap.: £5,000 in £1 shares. Dirs.: W. H. Hotton, 180, Birmingham Road, Wylde Green; T. B. Walker, 31, Towcester Road, Northampton. Qual. of dirs.: £100.

May's (Confectioners), Limited. 2, The Parade, Broadwater Road, Broadwater, Sussex. To carry on the bus. of dlrs. in ice-cream, confectionery, etc. Nom. Cap.: £100 in £1 shares. Dirs.: Not named. Subs.: H. G. Beavis, 14, Morley Avenue, N. 22 (clk.); E. W. Keen, Crantock, Hazeldene Drive, Pinner, Middlesex (clk.).

Meesons, Limited. To take over the bus. of mnfrs. and retailers of confectionery cd. on by Weller and Meesons, Ltd. Nom. Cap.: £450,000 in 300,000 redeemable preference shares of £1 and 300,000 ord. shares of 10s. Dirs.: H. Weller, 208, Cornwall Avenue, Blackpool; S. Weller, Belfield, Park Road, Prestwich, near Manchester; H. Weller, 12, Latham Road, Southport. Qual. of dirs.: £500. Remun. of dirs.: £200 per annum (each) (chairman, £250).

Murphy, O. D. and Sons, Limited. To take over the bus. of mineral water mnfrs., ale and stout bottlers, etc., cd. on at Wrekin Works, Wellington, Salop, as "O. D. Murphy and Sons". Nom. Cap.: £20,000. Permt. dirs.: O. D. Murphy (gov. and mng. dir. and ch.) and G. C. Murphy, both of Haybridge Hall, Wellington, Salop; and R. G. Murphy, The Uplands, Hollyhead Road, Wellington.

Premier Ice-Cream Company, Limited To carry on the bus. of mnfrs. and distributors of ice-cream, etc. Nom. Cap.: £100. Permt. gov. dirs.: T. Pacitti, address not stated; L. Pacitti, 1, Princess Road, W. Croydon; M. Pacitti, 4, Princess Road, W. Croydon; A. Pacitti, 111, St. Saviour's Road, Croydon; H. C. Pacitti, 103, Windmill Road, W. Croydon; and D. Pacitti, 66, Queen's Road, W. Croydon.

Prestcold (Bristol), Limited. 5, Unity Street, Bristol. To carry on the bus. of mnfrs. of and dlrs. in refrigerators and cold storage machinery, etc. Nom. Cap.: £2,000 in £1 shares. Dirs.: L. A. Olive, 4, Pembroke Vale, Clifton, Bristol; R. C. Brooks, 51, Downs Park West, Westbury-on-Trym, Bristol. Qual. of dirs.: £1. Remun. of dirs.: As voted by the company.

Refrigerator and Cabinets (York), Limited. 21, Swinegate, York. To carry on the bus. of dlrs. in and/or mnfrs. of refrigerators, etc. Nom. Cap.: £1,000 in £1 shares. H. Sidebottom, of Colton Lane End, Tadcaster, signs as director.

Table Joy Products, Limited. 26b, Dover Road, Trading Estate, Slough, Bucks. To carry on the bus. of mnfrs. of and dlrs. in fruit juices, pulps and extracts, etc. Nom. Cap.: £500 in £1 shares. Dirs.: F. Felchlin, 5, Broad Oak, Farnham Road, Slough, Bucks; Mrs. E. Felchlin, 5, Broad Oak, Farnham Road, Slough, Bucks. Qual. of dirs.: £1. Remun. of dirs.: As voted by the company.

Thorne, Alfred (Eaton Bray), Limited. Two Counties Mill, Eaton Bray, Beds. To take over the bus. of millers and corn mchts. cd. on at the Two Counties Mill, Eaton Bray, Beds. Nom. Cap.: £10,000 in £1 shares (7,000 ord. and 3,000 pref.). Dirs.: C. G. Thorne, Eaton Bray, Beds; F. S. Moore, Eaton Bray, Beds; Dorothy A. Gutteridge, Holly Bank, Chesham, Bucks; A. Thorne, Eaton Bray, Beds (permt. gov. dir. and ch.). Qual. of gov. dir.: One ord. share. Other dirs.: £200 ord. shares. Remun. of gov. dirs.: £400 per annum. Other dirs.: As voted by the company.

Tizer, Limited. To take over the bus. of mineral water mnfrs., etc., cd. on by F. Pickup, T. Pickup, the Tizer Co., Ltd., and Radiant Table Waters, Ltd., at London, Manchester, Bristol, and elsewhere. Nom. Cap.: £100. F. Pickup, of 260, Manchester New Road, Alkrington, Middleton, signs as dir. Sub.: T. Pickup, 35, Sussex Place, Ashley Road, Bristol.

Valvona Ice Biscuit Company, Limited. Bridgewater Factory, Rodney Street, Manchester. To carry on the bus. of bakers, biscuit mnfrs., etc. Nom. Cap.: £7,000. Dirs.: Elizabeth Valvona, 6, Via Ciro Menotti, Florence; F. H. Koenen, 15, Ladybridge Road, Cheadle Hulme, Ches.; P. Buti, 64, Alphonsus Street, Brook Bar, Manchester; F. Koenen, 185, Bramhall Lane, Bramhall, Ches.

Waterworth Bros., Limited. 64, Durning Road, Liverpool. To take over the bus. of wholesale and retail fruit mchts. cd. on by John Waterworth, Ltd., and Waterworth Bros., Ltd., at Liverpool. Nom. Cap.: £175,000. Dirs.: J. Waterworth, Heathfield, Stanton Road, Bebington, Cheshire (ch.); J. W. Waterworth, Baroda, Cromptons Lane, Mossley Hill, Liverpool; T. Wood, Hillside, St. Helens, Lancs.

Watson Bros. (Table Waters), Limited. To carry on the bus. of mnfrs. and bottlers of mineral and aerated waters, etc. Nom. Cap.: £2,500. Dirs.: R. Watson (permt. mng. dir.) and Eva Watson, both of 26, Surrey Street, Batley.

The above-mentioned particulars of new companies recently registered have been extracted from the daily register of Messrs. Jordan and Sons, Ltd., company registration agents, Chancery Lane, W.C. 2.